

THE IRON AGE

New York, Thursday, July 19, 1906.

The Blast Furnace Plant of the Federal Furnace Company.

Notwithstanding the important position occupied by Chicago and contiguous territory among districts consuming foundry, malleable Bessemer and charcoal pig iron, only a portion of the iron melted in the foundries of that district is supplied by local furnaces, the bulk of the tonnage being contributed by Tennessee, Alabama, Virginia, Ohio and Michigan. During the past few years this inadequate local supply has been still further curtailed by the diversion of several merchant stacks to Bessemer iron for steel works requirements, one having

adapted to large industrial operations. The stream is dredged to a depth of 21 ft., permitting the largest ore carriers to enter from Lake Michigan and discharge the cargoes at the present docks. Excellent railroad transportation facilities are also provided, and include direct connection with the Pennsylvania, Indiana Harbor and Chicago Junction railroads, the last named making connection with every road entering Chicago. The general arrangement of the plant, as shown in Fig. 1, provides for the erection of ore and coke bins, furnaces and

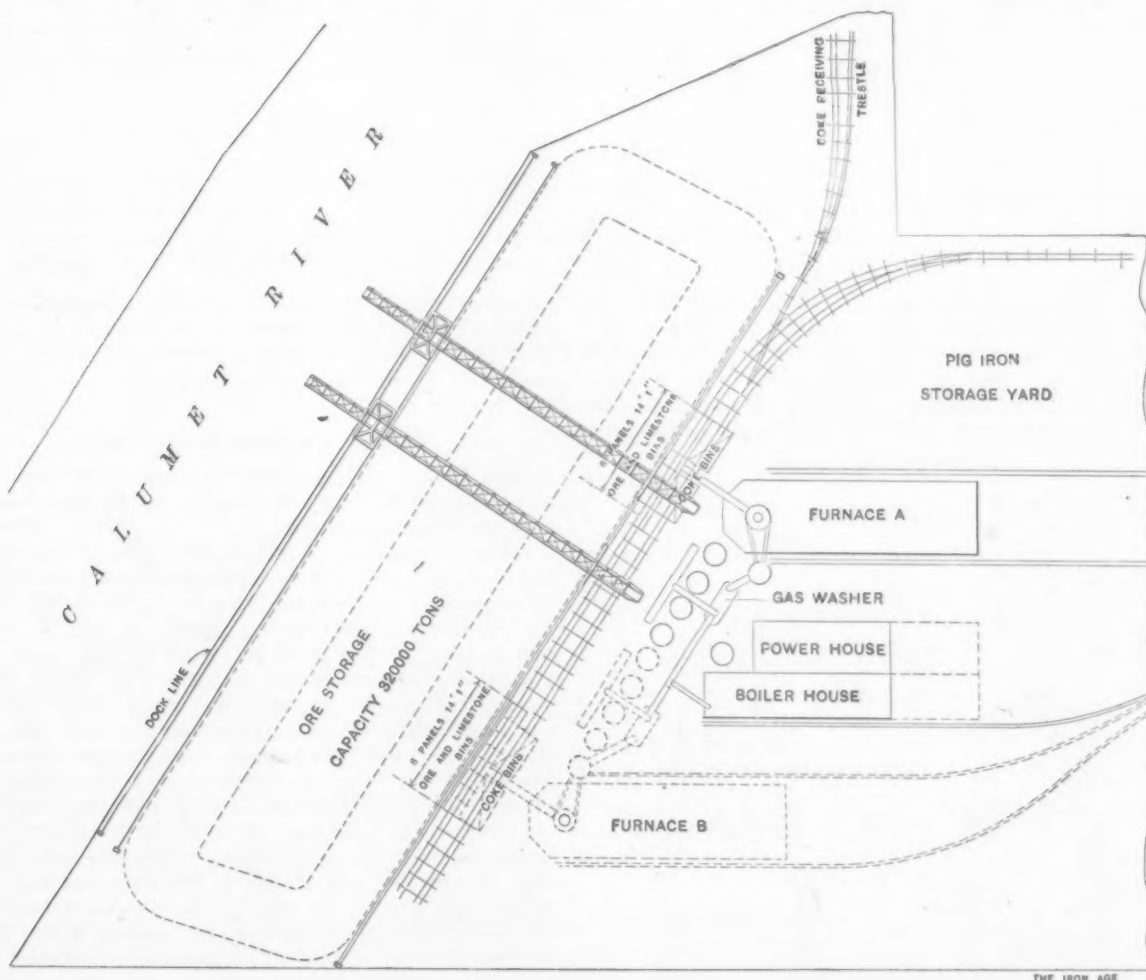


Fig. 1.—Plan of the Blast Furnace Plant and Ore Storage Yard of the Federal Furnace Company, South Chicago, Ill.

been acquired by the International Harvester Company and two at the Bay View Works of the Illinois Steel Company having turned from foundry iron more than a year ago to relieve the shortage at the South Chicago plant.

Under such favorable conditions for the disposition of its product, the Federal Furnace Company, Chicago, is erecting at East Side, on the Calumet River, opposite South Deering, within the confines of the city, a blast furnace plant particularly designed to meet the exacting requirements of the merchant iron trade. The plans as prepared by Julian Kennedy, mechanical engineer, Pittsburgh, provide for two stacks, each of 350 tons daily capacity. At present the erection of only one is being proceeded with, although practically the full equipment for two is now being installed. The site comprises 24 acres, with a river frontage of 1200 ft., and is well

stoves on a line parallel with the river and docks, the power plant being located between the two stacks. The ore storage yard will run the length of the plant, paralleling the river between the docks and bins. Fig. 2 shows the ore bridge in section, and Figs. 3 and 4 give end views of the bridge pier and shear leg. Coke will be brought in over a trestle from which the cars will discharge directly into the coke bins.

A Steel Tube Incline.

The furnaces will be 75 ft. high and will have a bosh diameter of 18 ft. 6 in. and a hearth diameter of 11 ft. These dimensions give a sufficient batter to permit of the use of a high percentage of fine ores if desired. Each stack will be provided with four Kennedy two-pass hot blast stoves 75 ft. high and 20 ft. in

diameter, having central combustion chambers. The Kennedy closed top will be used, provided with a distributing hopper. Filling operations will be controlled by the hoisting engineer. It is the intention to divide the entire circuit of the large bell into five sections, each charge slightly overlapping the other. The hopper is operated on ball bearings and by its use the uniform charging of the stacks is assured. The blast will enter the furnaces through eight tuyeres, this number being

the gas distributing main, from which the gas is taken into the stoves and to the boiler furnaces. The gas will pass from the top of each furnace through two downcomers to the dust catcher, where some of the fine particles will be caught, and then into a chamber 30 ft. long and 6 ft. in diameter, which has a lateral opening its entire length. From this chamber it passes into the gas washer where, striking a parabolic baffle plate, it is thrown downward and impinges on a swiftly running

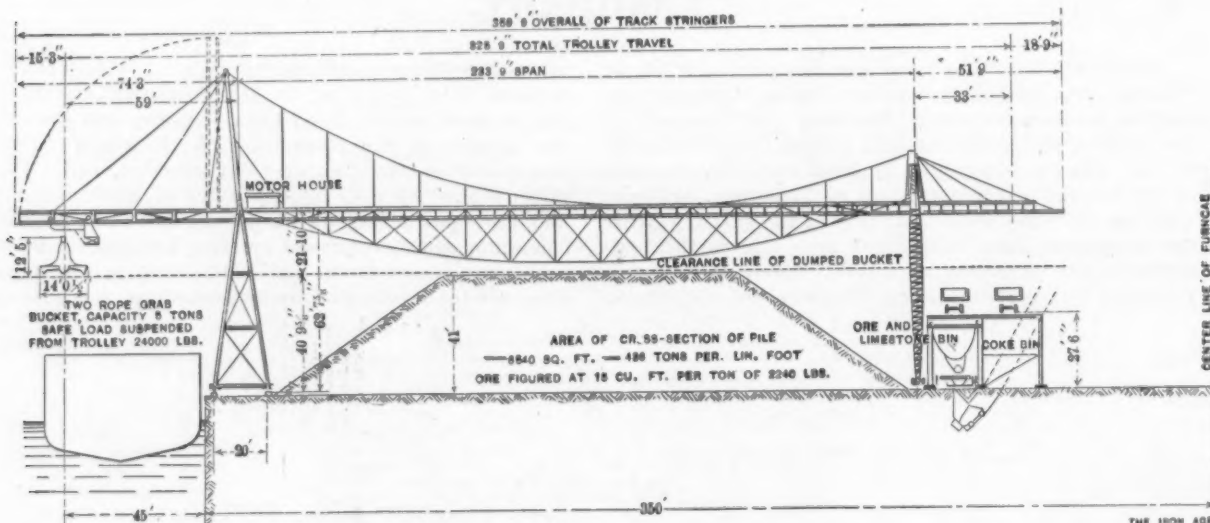


Fig. 2.—Side Elevation of the Ore Bridge and Storage Bins.

considered amply sufficient for a stack of the rated capacity proposed. The construction of the skip car incline is unique. Provision is made for only one skip for each furnace, and its capacity is 120 cu. ft. Instead of the usual bridge type of double skip hoist the car will run to the top of the stack through a steel tube,

stream of water. From this chamber it passes into another, striking another baffle plate and again impinging on running water. By this means the gas will be freed from dust and at the same time its saturation with water will be prevented.

The Ore Handling Equipment.

Ore bridges and unloading equipment, the ore, coke and limestone bins and the electric larries and transfer cars are being built and installed by the Brown Hoisting Machinery Company, Cleveland, Ohio. The ore yard and bins will be served by two single-span Brown electrically driven bridge tramways having a length of 350 ft. 9 in. over all, a total trolley travel of 325 ft. 9 in. and a span of 233 ft. 9 in., with a total travel the length of the yard of 800 ft. The yard will have a storage capacity of 320,000 tons. Each bridge will be equipped with a one-man trolley and one 5-ton two-rope Brown patent ore grab bucket. Each bridge consists of one span of Brown parabolic truss type girders supported at one end by a double pier and at the other end with an A frame shear leg, together with cantilever and apron bridge tramway extension. Each bridge has roller bearings and pivoted connections at the pier and ball and socket connection at the shear, thus allowing a mechanical skew in either direction of 1 ft. crosswise and 9 ft. lengthwise. The bridges will be capable of hoisting full loads at the rate of 250 to 350 ft. per minute and to convey them along the bridge tramway at 900 to 1000 ft. per min. Each bridge will be capable of traveling with a full load at the rate of 50 to 75 ft. per minute. One operator located in the man trolley will control the movements of the bridge, trolley and bucket. Iron ore, excepting hard lump ores, can be unloaded by each bridge tramway with the grab bucket from any modern steamer having unobstructed holds and large hatches, at the rate of 150 tons per hour for the average trolley travel the length of the bridge.

The Bin System and Ore Larries.

For furnace A one set of ore and limestone bins, of the Brown suspended parabolic type, will be installed, 112 ft. 8 in. long divided into eight panels each 14 ft. 1 in. long. The plates forming the bin proper are curved to the parabolic shape and the upper ends are attached to upper head girders, columns forming the supports for the girders and bins. Suitable arrangements will be made

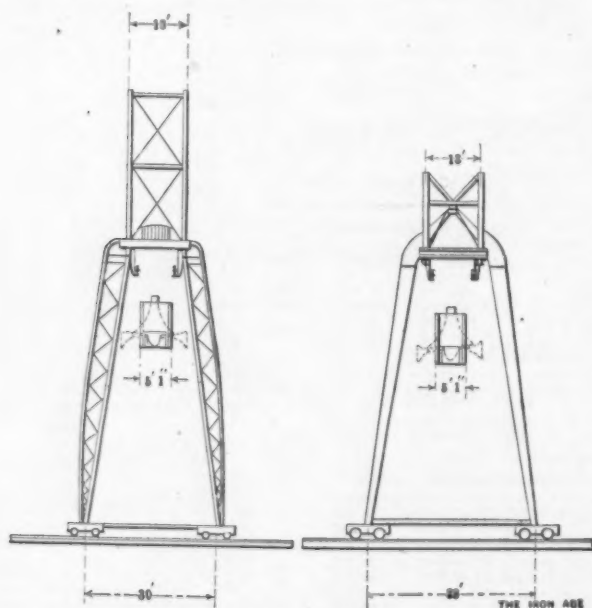


Fig. 3.—End View of Pier.—Maximum Load on Each Wheel, 62,600 Pounds, of Which 18,900 Pounds Is for Wind.

Fig. 4.—End View of Shear Leg.—Maximum Load on Each Wheel, 52,600 Pounds, of Which 14,600 Is for Wind.

shown in Figs. 5 and 6, having a diameter of 7 ft. and constructed of riveted plates. The car will have a cylindrical hopper and will travel on a 4-ft. track. With this type of incline construction it is practically impossible for the cars to leave the tracks, there is no danger from dropping material, and other stoppages due to accident on bridge inclines are obviated.

Each furnace will be provided with a Kennedy gas washer, located at a point between the dust catcher and

so that wooden partitions can be placed at the different panel points and separate the various grades of ore. The two end partitions will be of steel construction. Sixty-ton ore cars with their maximum load making a total weight of 160 tons per car can be run along the top of the bins. Sixteen spouts and gates will be attached to the bottom of the ore and limestone bins, spaced two spouts to each panel. These will be operated by electric power by the man on the larry. The bins are so designed that there is ample clearance for the man standing on the larry platform and traveling underneath. Two coke bins made of steel plates and beams, each 42 ft. 3 in. long and 19 ft. 8 in. wide, will be installed. The upper portions of these bins will be rectangular in shape and the lower portions and bottom will slope in such a way that the coke can be all thrown off from one point over the skip car. Each bin has one spout and gate operated by hand power. The bins are also supported by columns and have a track on top to carry loaded coke cars.

The electric larrys which will convey the ore and limestone from the bins to the skip will each be equipped with one 120-cu. ft. bucket, which will be attached to the upper framework of the larry. Each bucket is designed to take a load of 10,000 pounds of ore and will be provided with a suitable scale for weighing the different kinds of ore and limestone. The larrys will be capable of traveling at a speed of 400 ft. per min. with a full load. The transfer car, which will also be electrically operated and capable of traveling at the rate of 400 ft. per min., will be of structural steel framework mounted on four truck wheels. It will support a small house for the operator and a hopper divided into four V-shaped compartments equipped with hinged doors with openings for discharging the contents of the com-

are broken they will pass through a chute into cars located directly below. As the level of the property is at datum and it is desired to raise it a height of 8 ft. no slag pit has been provided. The slag will be tapped directly into power dump ladles and will be used for filling around the plant as desired.

Blowing Engines.

The boiler house and power plant equipment will be located in one building, 76 x 84 ft. and a wall running

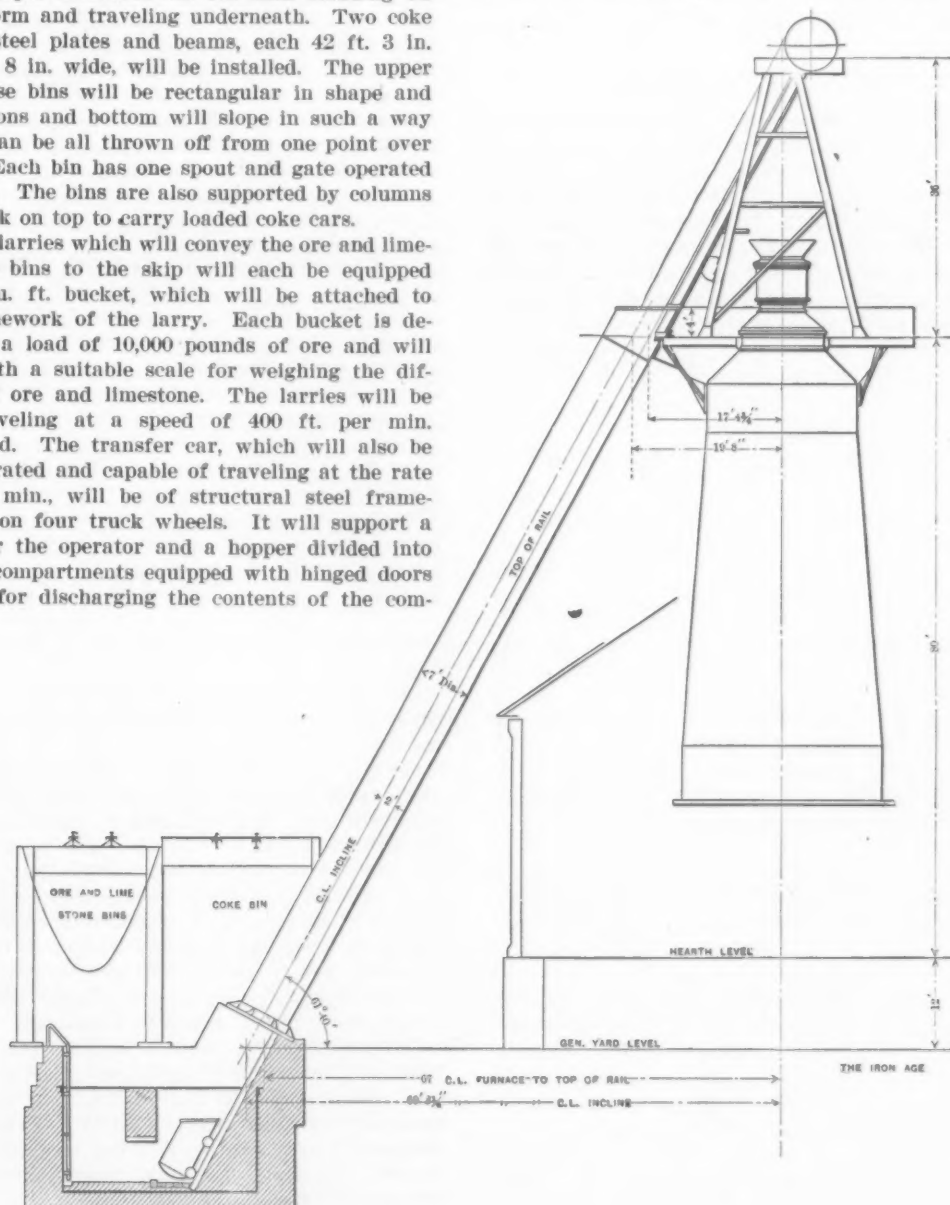


Fig. 5.—Side Elevation of Furnace Top, Skip Incline and Bins.

partments. The doors will be operated from the controller's house and will be so arranged that those of two adjacent compartments will open at the same time, or, in other words, half of the contents of the car are discharged at the same time when one set of connected doors is opened.

The Casthouse and Pig Breaker.

The casthouse will be 220 ft. long and 64 ft. 9 in. wide and will be of steel construction with brick curtain walls. All of the iron will be cast in sand and the pig mold will be handled by an overhead tram rail and trolley system. A Brown patent pig breaker equipment will also be installed by which the iron is handled at a small cost and a minimum amount of labor. The sows are conveyed to the pig breaker by means of an electrically driven traveling crane carrying a hook and operating the entire length of the casthouse. The breaker will be hydraulically operated and will be located at the end of the casthouse opposite the furnace. As the pieces

its entire length will divide the two departments. Steam will be generated in eight units of gas fired Stirling boilers of 345 hp. each, set two in a battery. Air will be furnished by three vertical, long crosshead, disconnected, compound condensing blowing engines, two high pressure and one low pressure, built by the Southwark Foundry & Machine Company, Philadelphia, Pa. The high pressure engines will have steam cylinders 44 in. in diameter, air cylinders 84 in. in diameter and 60-in. stroke, and are designed to work with an initial steam pressure of 150 pounds. The low pressure engine will have steam and air cylinders 84 in. in diameter, with 60-in. stroke. This engine is designed to work compound with either of the two high pressure engines and will be located between them. All are designed to work against a maximum air pressure of 30 pounds. Each air cylinder will have a piston displacement of 20,000 cu. ft. of free air per minute when the engine is operating at normal speed. The steam cylinders are fitted with Corliss valves and gear, the air cylinders with patented automatic out-

let and positive inlet gridiron valves. The high pressure engines will be controlled by a governor with variable speed device and the low pressure engine will require no governing device when running compound, to insure uniform speed of both high and low pressure engines. Provisions will be made on the low pressure side when running as independent engine to control the steam admission either by hand adjustment or by governor. A system of valves is provided so that either engine can readily be run separately or noncondensing as the occasion may demand, affording as well a great convenience in maintenance and repair.

Condenser and Pumping Plant.

The condensing plant for the above engines is of the Weiss counter-current type, consisting of a cylindrical vessel placed at an elevation allowing the water to run from it through the main barometric tube against the pressure of the atmosphere, this tube ending with a foot valve in the hot wall. A secondary barometric tube and foot valve is provided for the removal of any moisture which may be carried into the pipe leading to the dry air pump. The condensing vessel is supported by a structural steel tower. The auxiliary machinery consists of a horizontal steam engine and a Weiss dry air pump

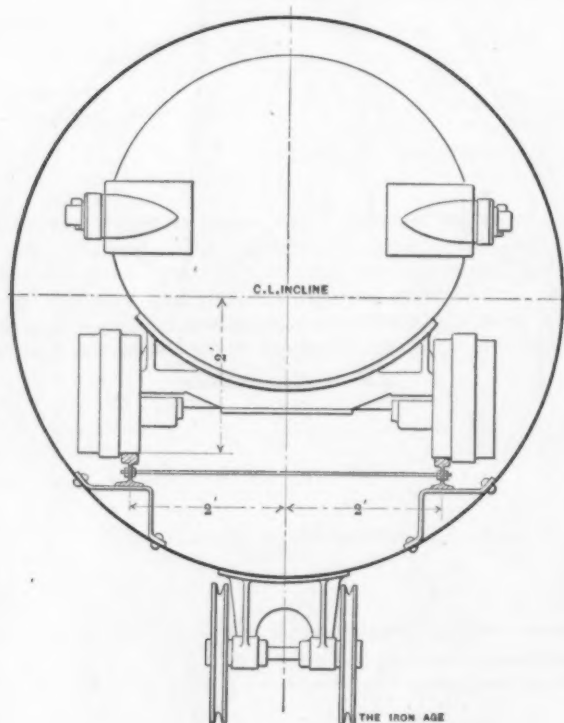


Fig. 6.—Section of Incline, Showing Skip Car.

placed tandem, the engine being of the crank and flywheel type and having a governor arranged for variable speeds. The water pump is of the Bibus rotary type, driven by belt from the air pump engine. The condenser is of capacity to condense 110,000 pounds of steam per hour when supplied with cooling water at 70° F. and maintaining a vacuum of 25 in. of mercury. It also has capacity for varying quantities of steam at different temperatures of cooling water, and will give a vacuum corresponding to the work it is called upon to do, the vacuum being higher as the cooling water is lower or the amount of steam to be condensed is less. Two 10-in. single stage turbine pumps designed to work against an 85-ft. head, having a maximum capacity of 4,000,000 gal. in 24 hr., will be installed by the Platt Iron Works, Dayton, Ohio. These pumps will be operated by two Westinghouse type S direct connected motors of 120 hp. each, provided with special starting and stopping rheostat, by which the speed can be varied from 725 to 850 rev. per min. The electric plant will contain two Western Electric generators of 300 kw. capacity, built by the Erie Iron Works, Erie, Pa., of 645 hp. each. The switchboard will

contain eight panels and is arranged to take care of all overloads. It will be of the insulated station type.

The roofs of all buildings will be covered with cement tile, reinforced with expanded metal, set in such a way that any piece can be replaced as required. This style of covering over the casthouse is believed to be almost indestructible and will not be injured, except by unusually heavy explosions, and the discharge of large lumps from the furnace top, and is impervious to the action of the gases which arise when casts are being made. Foundations for the entire plant were built by John J. Jones, South Chicago, and all of the boiler plate work is being constructed by Hibben & Company, South Chicago.

The officers of the Federal Furnace Company are W. L. Brown, president; C. P. Wheeler, vice-president; A. F. Maynard, secretary and treasurer, and Harry Kennedy, superintendent. The offices are located in The Rookery.

New York Rapid Transit Extensions.

In *The Iron Age* of February 1 last there was published, together with a map, a complete description of the nineteen routes proposed by the Rapid Transit Commission of the present subway system of New York City. A few days ago the Supreme Court decided favorably upon all these lines, with the single exception of that known as route No. 9, which provides the loop connections for the Manhattan and Brooklyn lines. According to the Rapid Transit law, the consent of the court may be taken in lieu of the consent of property owners abutting upon the route, so that the commission is now free, as far as legal questions are concerned, to go on with the construction. The engineering part of the undertaking has about been completed, so that there need be no delay upon that score.

Financially the city is in good shape, as its borrowing capacity, which must not exceed 10 per cent. of the total valuation of the real estate, is still open to the extent of something over \$50,000,000. Therefore there would be money sufficient to start the new lines without encroaching upon other improvements of equal importance, but neither the Board of Estimate and Apportionment nor the commission desires to advertise for proposals until they have power to incorporate route 9 in the general scheme. The plan most favorably considered is to provide lines extending from the Harlem to the outskirts of Brooklyn and to the sea, so that the successful bidder would have the operation of an entire route through the whole city. This method, it is thought, would be the most likely to attract outside capital. If the routes were short and divided they would serve merely as feeders for the present subway and would have no independent standing. Dividing the lines would give the Interborough Company a vast advantage in the terms to be offered to the city for the privilege of operating the lines for a term of years.

The court will probably decide upon the loop lines, route 9, by October 1, immediately after which bids will be asked for construction. According to this programme the entire work should be under way before the first of the year. It is expected that the total expenditure will reach over \$200,000,000.

Commercial failures in the United States in the first six months of 1906, as reported to R. G. Dun & Co., numbered 5612, as against 6210 in the corresponding months of the previous year, while liabilities aggregated \$62,664,074, against \$55,904,585 in 1905. Distinct improvement is noted in manufacturing insolvencies, 1260 failures for \$21,989,522 comparing with 1426 last year, when the amount involved was \$23,343,220. Trading failures were 4154 with \$25,505,978 indebtedness, against 4626 with \$28,894,578 indebtedness in 1905. An adverse showing is made by 198 failures of real estate, insurance, brokerage and similar companies for \$15,168,574, comparing with 160 last year, when the amount involved was only \$3,666,787. Of banks and other fiduciary institutions there were 28 suspensions, with liabilities of \$5,585,332, against 44 last year, when the indebtedness was \$9,803,307.

A Rateau Steam Regenerator Installation.

The first installation in America of the Rateau system of utilizing exhaust steam from reciprocating engines by means of steam regenerators and low pressure turbines is to be applied in the International Harvester Company's Irondale steel works at South Chicago. The equipment will be furnished by the Rateau Steam Regenerator Company, 215 Wabash avenue, Chicago, and will comprise two Rateau steam turbines of 500 kw. capacity, direct-connected to direct-current generators operating at 250 volts and 1500 rev. per min. The steam for the turbines will be the exhaust from a reversible rolling mill engine passed through a water-type regenerator, and a barometric condenser will be used.

A description of the Rateau turbine appeared in *The Iron Age* May 26, 1904, and the regenerator was described in the issue of June 2, 1904, in an abstract of a paper by A. Rateau before the joint meeting of the Institute of Mechanical Engineers and the American Society of Mechanical Engineers at Chicago in that year. The subject of the paper was "Different Applications of Steam Turbines."

A paper on "The Utilization of Exhaust Steam from Rolling Mill Engines, Hoisting Engines, Steam Hammers, &c., by Means of Steam Regenerators and Low Pressure Turbines on the Rateau System," was read by L. Battu before the eleventh annual meeting of the Lake Superior Mining Institute in October, 1905. The following extract from the latter paper will serve to recall the nature and functions of the regenerative steam accumulator.

"Utilizing the exhaust steam from continuous running reciprocating engines in a turbine requires only that the irregularly intermittent exhaust from the engine be converted into a continuous supply of steam for the turbine. The principle upon which the apparatus is based involves the application of the properties possessed by saturated steam and saturated liquids respectively, when brought together, and of the heat exchanges which take place between the steam and water, either directly or through the medium of metallic surfaces. Under any specified conditions of pressure and temperature these two fluids—saturated steam and steam-saturated water—composed as they are of similar molecules, preserve a reciprocal condition of equilibrium, so that any variation of this equilibrium determines the transformation of either form of liquid into the other form, with a corresponding absorption of heat in one case or liberation of heat in the other. It follows, therefore, that if the intermittent exhaust steam be conducted to a receiver containing cast iron and water, the cast iron will absorb heat and cause upon its surface the condensation of a certain quantity of steam which remains in the state of steam saturated water. Owing to this condensation heat accumulates whenever an abundant supply of steam arrives in the accumulator and causes an elevation of temperature, and such steam as is not condensed causes a slight rise in pressure. This rise of pressure is adjustable and is only relative, as all these functions may, if necessary, be carried out at or below atmospheric pressure. When the supply of exhaust steam ceases, the steady demand of the turbine reduces the pressure and provides the necessary disturbance of heat equilibrium. The latent heat of the steam held in reserve by the cast iron and the water serves to vaporize a given weight of water, and the flow of steam to the turbine is thus maintained absolutely constant. These exchanges of heat take place with extreme rapidity, and the necessary fluctuations of temperature and pressure can be exactly regulated by the design of the accumulator and the regulation of the release valve.

Two types of regenerators are built, as was described in the paper abstracted in the June 2, 1904, issue of *The Iron Age*. These two types are respectively the mixed regenerator with cast iron trays containing water and the simple water accumulator. The latter is the type to be installed in the Irondale steel works and con-

sists of one or more horizontal cylindrical bodies of wrought steel plate, in the interior of which are arranged a number of elliptical tubes which extend from end to end of the vessel and are so placed as to leave spaces between them. "There are as a rule four to six tubes, in pairs, and the adjacent sides of each pair are pierced with a number of small holes. Baffle plates are arranged above the space between each pair of tubes. The steam enters through a non-return valve and passes to the interior of the elliptical tubes and escapes into the spaces through the perforations. The circulation of the water is rapid to facilitate the interchange of heat between the water and the exhaust steam, water being a poor conductor. When the supply of steam from the main engine ceases the water liberates the steam it has absorbed and an even flow of low pressure steam is given off, while the steady demand of the turbine reduces the pressure in the accumulator, causing the steam still retained in the tubes to escape, maintaining the circulation of the water and facilitating the liberation of steam. Experience has shown that the whole of the contained water participates in the regenerative action. The steam is taken from the top of the accumulator to the turbine, and the pressure is regulated by a relief valve. The water level is maintained constant by a ball float contained in a small tank at the back of the regenerator."

The Wright Telegraph Railroad Signal.

The attention of railroad men has been attracted to the telegraph railroad signal for the manufacture of which the Telegraph Signal Company has been organized at Rochester, N. Y. The signal is the invention of Selden R. Wright, a railroad telegrapher. It is essentially an emergency device, primarily for use on single track railroads, and is intended to place the control of semaphores at the several stations under the control of the dispatcher. By means of this signal the dispatcher may throw a semaphore to "stop position" at any desired point, regardless of the condition of the operator's instrument at that station, that is whether or not the key of his instrument on the dispatcher's wire is open. The signal instruments form part of the operator's apparatus at each station, the relay being used to operate the semaphores and bell signal. The signal devices at all stations are identical. Each instrument is provided with an accurate and unfailing selector which enables the operator to select not only the required station but the particular semaphore which he wishes to operate. For each station there are three contacts on the selector drum—one for the first semaphore, one for the second and one for a bell signal.

Briefly, the signal operates in this way: If the dispatcher wishes to throw, say, the east bound semaphore at a station he would hold the key of his instrument open 50 sec. At the expiration of 40 sec. a contact would be made which would cut out the keys at every instrument on the circuit. At the end of 50 sec. contact would be made through another contact point, which would enable the dispatcher to operate the selector. By means of his key the dispatcher would step the selector to the number of the semaphore which he had selected to throw and wait 20 sec. At the end of that period the semaphore would be thrown to "stop position," and a messenger call signal would apprise him of the fact. Closing the key a few seconds later would restore all of the signal devices at all of the stations to normal, leaving the interlocking semaphore to be drawn to safety position when everything was clear. The other semaphore or bell signal would be operated in a similar way.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has received an order for five Hulett 10-ton automatic ore unloaders for the Indiana Steel Company's new plant at Gary, Ind. The machines are to be operated electrically. This is the largest single contract ever placed for ore unloading equipment. The company also recently received an order for two of these machines for the National Tube Company's works, Lorain, Ohio, where two of the machines are already in operation.

The Crocker-Wheeler Rolling Mill Type Motor.

The requirements of a motor for operating the table rolls of rolling mills were particularly in mind when the form W motor, recently brought out by the Crocker-Wheeler Company, Ampere, N. J., was designed. A rather unique procedure was followed when the design of the motor was contemplated. The engineering department communicated with about 20 electrical and mechanical engineers, experts on rolling mill work, sub-

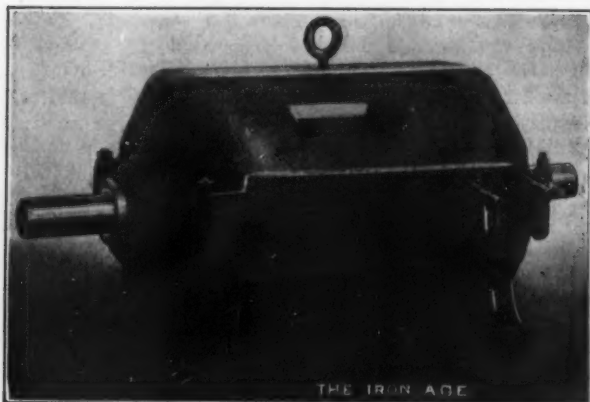


Fig. 1.—Exterior of the Crocker-Wheeler Form W Motor, Particularly Designed for Driving Rolling Mill Tables.

mitting to them blank specifications for inserting what in their opinion constituted a motor best suited to this special service. Among the companies whose representatives were asked to submit recommendations were the Lorain Steel Company, the National Tube Company, the American Steel & Wire Company, the Republic Iron & Steel Company, the Youngstown Sheet & Tube Company, the Cambria Steel Company and the Carnegie Steel Company. From the returns of this canvass the final specifications were drawn, the company's own engineers adding what their experience prompted, and it is believed

that of the parts of ordinary motors of twice the rated capacity of these machines. The motor is completely inclosed, even the ends of the bearings being sealed so that no particles of dust can enter, but can be completely disassembled by lifting the top half after removing only four external bolts. The armature is so designed and proportioned with reference to the field that the motor will operate in both directions under ordinary overloads without sparking. The insulating material is fireproof, so that the motors can be operated in the hottest places without danger of injury.

The field frame is cast steel and of octagonal shape, with four poles, and is divided horizontally, hand hole covers on front and rear ends allowing inspection of the interior. The laminated sheet steel pole shoes are bolted to the poles, with the nuts on the outside of the field frame. Each foot is drilled for two heavy foundation bolts, and is designed for great strength, to withstand the heavy torque peculiar to this class of motor. The commutator is constructed in the usual way, with deep bars to insure long life, and insulated with mica. The clamping bolts are accessible from the front of the commutator, which facilitates removing the armature.

The shaft, of forged steel turned and ground, is much larger than for other types of motor of the same output. On both ends the shaft is extended, so that the pinion may be placed on either end and a brake on the opposite end. The shaft if damaged can be readily removed without disconnecting the windings from the commutator, as the latter is keyed to a sleeve extension of the flange forming one end of the armature core. The armature windings each consist of a single turn of flat copper strips separated from one another by asbestos, and joints occur only at the commutator bars. The conductors lying in one slot are bound together with insulation and the slot is lined with insulation before the completely insulated coil is inserted, to thoroughly guard against short circuits and grounding on the core. The coils are below the surface of the core, being held in place by wedges, so that the conductors are protected from rubbing of the armature on the pole shoes and from metallic dust collecting in this part of the armature. No band wires are used, except at each end outside of the core. A large air gap minimizes the trouble due to

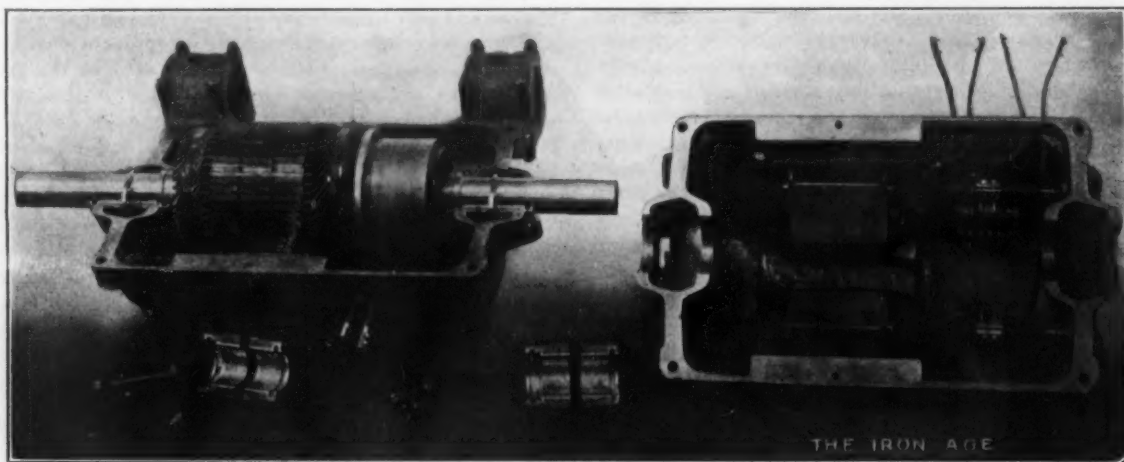


Fig. 2.—The Form W Motor Opened, Exposing the Interior.

that the motor embodies the features necessary to thoroughly adapt it to the work. Primary considerations in a motor of its type are that it must be completely inclosed and able to withstand without injury the intermittent but very heavy and jerky loads to which it is subjected.

The W motor is built in four sizes, of 25, 50, 75 and 100 hp. normal capacities respectively, all wound for 220 volts, and having speeds of 550, 500, 450 and 400 rev. per min. respectively. The accompanying illustration, Fig. 1, shows a general view of the exterior of one of these motors, and Fig. 2 shows an open view, exposing the armature and internal parts. It will be noticed that the parts are simple and heavy, and it is stated that their strength corresponds approximately to

wear of bearings and displacement of armature from its central position.

The brushes are carried in cast bronze boxes clamped to large square steel studs screwed securely into the ends of the motor frame and insulated by fiber tubes. The brushes fit accurately and slide in machined ways, and are held on the commutator by curved fingers actuated by coiled springs. The brush boxes can be adjusted to follow up the wear of the commutator. In the two smaller sizes of the motor there are two brush holder studs, both placed in the upper half of the frame. In the other sizes there are four studs per motor.

Either series or compound wound motors are furnished. In the compound winding the shunt coils are designed to prevent the motor running at more than

double speed if the load be thrown off. The use of asbestos insulation in the field winding renders it fire-proof and permits running the motors under greater overloads and placing them in hotter locations than ordinary motors. All of the armature and field terminals are of heavy cable, brought out from the upper and lower halves of the frame through fiber bushings. In order that the shunt connections may be made between controller and switch the shunt terminals of compound motors are brought out independently of the other terminals.

An important feature of the motor is the sealed type of bearing, which prevents the entrance of dust and other injurious materials into the bearings. They consist of heavy cast iron cylinders, split horizontally, and lined with babbit metal. A large groove surrounding the shaft at both ends of the bearings stops the flow of oil along the shaft and returns it to the oil reservoir. The bearings are ring oiling, with spiral grooves for distributing the oil. Supports for countershaft bearings are cast on one side of the lower half of the magnet frame, and the bearings are constructed the same as for the armature. Pinions are of forged steel and gears of cast steel, with teeth cut from the solid, with liberal face to withstand the heavy, jerky loads. The gear cases are of cast iron, divided horizontally and bolted to pads on the end of the motor frame, with openings for lubricating the gears.

After running continuously for one hour at full load the temperature rise will not exceed more than 75 degrees C. on the windings. However, the liberal use of asbestos in the windings, in place of vegetable substances, permits running the motors very much hotter without injury. This feature of the W motor is peculiarly valuable for rolling mill work, because it must often be placed in a very hot location.

Recent Customs Decisions.

Black Steel Sheets.

The Board of United States General Appraisers on July 7 handed down a decision in the customs protests case of Dickerson, Van Duzen & Co., New York, in which it was held that common or black steel sheets, cold rolled and smoothed only, are properly dutiable at the rate of 7-10 cent per pound and 2-10 cent per pound additional. The steel was valued at not more than 3 cents per pound. In the official protest the importers alleged that the material is not galvanized or coated with any metal or pickled, nor is it cold rolled. The decision, written for the board by General Appraiser Fischer, is to the effect that the evidence submitted by the importer is wholly insufficient to overcome the presumption of correctness which attends the official action of the collector. The contention of the importing firm was overruled.

Brass Clasps for Bracelets.

It has been decided by the customs court that catches, or swivel clasps, composed of brass and chiefly used in the construction of toy bracelets and necklaces, are properly dutiable at the rate of 45 per cent. under the provision in the tariff law for "manufactures of metal." The action of the Collector of Customs at New York in returning the merchandise as jewelry, with a tax of 60 per cent., is reversed.

Spring Rings.

General Appraiser Sharretts has directed the collector at New York to cease returning metal spring rings under the provision for jewelry, with duty at the rate of 60 per cent. Instead the Board of Appraisers finds that the merchandise should be assessed at the rate of 45 per cent. under the metal paragraph in the tariff law.

One Office to Prosecute Customs Cases.

The Treasury Department is about to put into operation a new plan for the prosecution of customs cases arising before the Board of United States General Appraisers and the Federal courts. In the closing days of the recent session of Congress a bill was passed creating an office to be known as "customs solicitor," with a view to concentrating in one office the care of tariff litigation. As enacted into law the solicitor's bill represents the

views of the Secretary of the Treasury, who from a long study of the question has reached the conclusion that the interests of the Government will best be conserved by dispensing in the main with the services of Federal district attorneys and their assistants in litigation affecting the customs. Heretofore three sets of Government attorneys have represented the United States in tariff cases, as follows: Before the Board of General Appraisers, special Treasury counsel; in the Circuit Court and the Circuit Court of Appeals, district attorneys or their assistants, and in the Supreme Court, either assistant attorneys-general or special attorneys-general.

It has happened in the past that important cases dealing with the classification and administration of tariff matters have been lost to the Government in the courts owing to the lack of understanding of specific subjects on the part of district attorneys, who for the most part are slightly acquainted with the antecedents of the cases they are trying, as well as the questions of law involved. Under these circumstances the Secretary of the Treasury decided to put all important tariff litigation in the hands of one office. One of the reasons understood as influencing the Secretary is the practice of importers of retaining the same counsel from the time a protest case goes to the Board of Appraisers until final arguments are concluded in the Circuit Court of Appeals or the Supreme Court, as it may happen. It has been notorious for many years in customs and importing circles that importers have many times won cases before the judiciary owing to the superior knowledge and arguments adduced by lawyers for the importers.

Grinding Plates.

It has been decided by the Board of United States General Appraisers that steel casting grinding plates cannot be regarded as manufactures of metal within the meaning of the tariff law. The specific case passed upon by the board stood in the name of Thomas Prosser & Son, New York. The collector of customs assessed duty on the basis of 45 per cent., whereupon the importers took an appeal to the customs court, making the claim that the articles should be granted a lower rate of duty under the provision in the act for "shapes, castings, plates, or steel in all forms and shapes," according to the value per pound. In finding for the importers, General Appraiser Fischer says, in part: "It is proper to add that the not inconsiderable amount of work in the way of machining, drilling, countersinking &c., which has been done on these plates does not involve any change in their dutiable classification under the *eo nomine* provision for steel plates, for the reason that they still remain plates and have not become a different article. An authority on this point is the decision of the Circuit Court of Appeals in the case of *Magone vs. Vom Claff*, wherein it was held that strips of steel which had been tempered and had had their edges rounded for the purpose of being manufactured into tape measures, not having been converted into another article, but still remaining steel strips, were dutiable under a provision contained in paragraph 177 of the tariff act of 1883 for steel strips."

The new plant of the Central Pennsylvania Traction Company, at Harrisburg, is housed in a building 175 ft. long, 102 ft. wide and 40 ft. high. The frame is steel and the walls of concrete. The equipment consists of three 1000 hp. Allis-Chalmers Corliss engines, direct connected to 650-kw. generators. The units have an overload capacity for short periods of 50 per cent., thus giving the plant a maximum of 4500 hp. The ultimate capacity is to be from 9000 to 10,000 hp. The engine room, which measures 50 x 170 ft., is served by an electric crane of 30 tons capacity. The boiler room is 45 x 170 ft. and contains at present five 327 hp. Keeler boilers. Water is to be drawn from the river through a 36-in. cast iron pipe, the mouth of which is near the center of the stream. This pipe is carried in a tunnel of 5 ft. diameter and 30 ft. underground, from the river bank, under adjoining property and into the plant. The new plant replaces three old ones, and has been designed for expansion to cover all power requirements for some time to come. The total cost was about \$250,000.

British Electric Pier Cranes.

BY EMILE GUARINI.

The two electrically driven jib cranes, numbered respectively 771 and 772, recently erected on the Admiralty Pier, Dover, England, call attention to the extensive and interesting work done by Siemens Bros. & Co., Limited, London, in electrical crane building and the advantages of electric driving for all kinds of cranes. These two Dover cranes have been erected to facilitate and accelerate the shipment of baggage, mails and express parcels to and from trains and channel steamers. They are designed to lift the goods in boxes or crates of a gross weight not exceeding $3\frac{1}{2}$ tons. Crane No. 771 has been erected on the No. 3 East Landing Stage of the pier and crane No. 772 at the No. 1 West Landing Stage, above the parapet of the pier. Each crane is capable of

motor having a capacity of 37 horse-power at 420 revolutions per minute, and the slewing motor 18 horse-power at 310 revolutions per minute. The latter also operates the derricking and traveling motions. These motors are of compact design, having cast steel frames, and are completely inclosed. The four poles are rectangular, cast with the frame and fitted with laminated pole shoes. The field and armature coils are form wound and the armature is of ironclad construction. As the cranes are in exposed positions special provision has been made for slewing against the wind, the motors provided being of greater power than would be necessary under ordinary conditions.

The speeds of the various motions are as follows: Hoisting at full load, 120 feet per minute, lighter loads at proportionately greater speeds; slewing at full load, one complete turn of crane, 350 feet travel of jib head in 40 seconds; slewing without load, 2 revolutions of

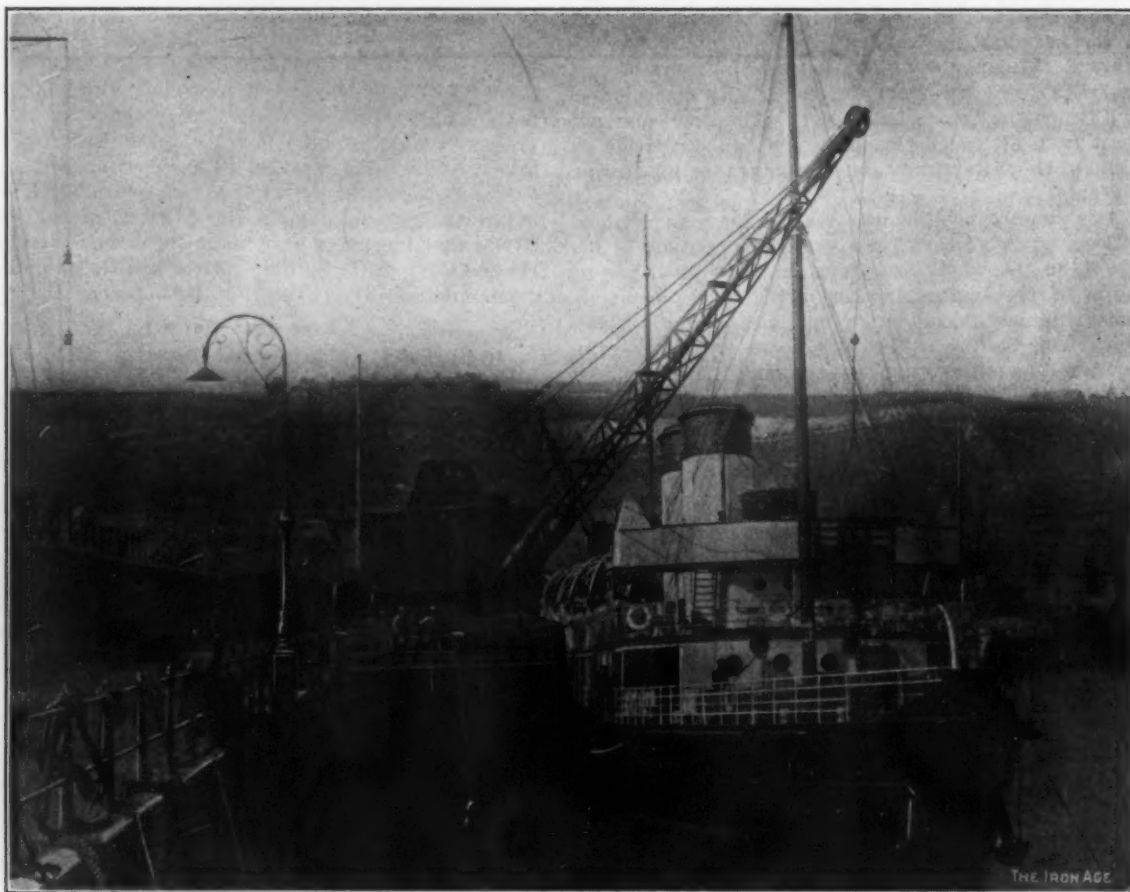


Fig. 1.—One of the Two Jib Cranes Installed on the Admiralty Pier, Dover, England, by Grafton & Co., Vulcan Works, Bedford.

lifting a maximum load of 4 tons at a maximum radius of 55 feet, and slewing or traveling with these loads suspended from the jib in any position, without being blocked or clipped to the rails.

The cranes have four motions—hoisting, slewing, derricking and traveling. The radius of action is variable up to a maximum of 55 feet, and the jib (which is made especially light so as to offer little resistance to wind pressure) is 60 feet long. The gauge of the rails is 10 feet and the total weight of each crane in working order is 53 tons. The cranes were built to specifications drawn up by the engineer of the Dover Harbor Board, A. T. Walmisley, Preece & Cardew of Westminster being the consulting electrical engineers. The cranes were constructed and the details of the mechanism worked out by Grafton & Co., Vulcan Works, Bedford, and Siemens Bros. & Co., supplied the electrical equipment.

The frame work of the cranes is of simple design and of Siemens-Martin mild steel. All of the gears are steel and those working at high speed are machine cut. The electric current is supplied at 500 volts by the Dover Electricity Supply Company, Limited.

On each crane there are two motors, the hoisting

crane per minute; derricking from maximum to minimum radius, in one minute; traveling, 100 feet per minute.

The controller is of the universal type, the direction of hook and load following the direction of the driver's hand. For example, if the lever is raised the crane hoists, swung to the right the load swings to the right, and so on. No part of the electrical equipment of cranes is of more importance than the controllers, as upon their proper working depend the efficiency of the whole apparatus, and to some degree the safety of the attendants. It is essential for a controller to work continuously in the hands of unskilled men under the most exacting conditions without breakdown. Little wear should occur to the contacts; sparking, due to the continual breaking of the current, should be prevented; the manipulation should be easy, so that the driver's attention shall not be distracted from the load; and the design should be neat and compact. In the Siemens controllers these requirements, it is claimed, have been fully met. All parts are readily accessible and the construction throughout is exceedingly simple. Heavy notching gear, so troublesome to the driver, has been discarded. The replacing

of any of the contacts or fingers, or the turning round of a contact to present a fresh edge to the arc, is the work of only a few moments. In practice, however, little necessity has been found for removing any of these parts, a magnetic blow-out being employed, which effectually prevents arcing, the principal cause of deterioration. With the universal type of controller, which is employed on the Dover cranes, both the hoisting and slewing motors may be set in motion at the same time by the simple movement of one lever, an arrangement which gives the drive an easy and effective control. The resistances are separate from the controllers, and serve to increase the balance weight of the jib.

Two brakes are fitted to the hoisting gear, one being automatic and worked by an electric magnet and so arranged that the act of switching off current after the hoisting applies the brake and vice versa. The second or emergency brake is operated by the driver's foot.

The Open Shop for Bituminous Mines.

HARRISBURG, PA., July 17, 1906.—At a conference between union miners and the operators of the central

to reduce the disputes at the mines which have been so vexatious. The action on the check weighman's fund is considered by some of the coal men to be a big stride, as in many districts such deduction is compulsory. The agreement in so far as it relates to these important questions reads as follows:

Any regularly employed miner may, at his option, authorize the deduction from coal mined, for use of a check weighman's fund, of such amount of coal as he may elect to subscribe, provided such authority is duly executed in writing by each individual miner, and such authorization releases the company from all liability on account thereof. There shall be no collection by the companies from day labor working in mines or outside. The collection of coal for check weighman's funds shall be from sheets on tipples.

The right to hire and discharge, the management of the mine and the direction of the working force, are vested exclusively in the operator, and the United Mine Workers of America shall not abridge that right. It is not the intention of this provision to encourage the discharge of employees or the refusal of employment to applicants because of personal prejudice or activity in matters affecting the United Mine Workers of America.

Should differences arise under this agreement between the employers and employees, touching the proper interpretation of any of its provisions, there shall be no suspension of work on account thereof, but an honest effort to settle such differences

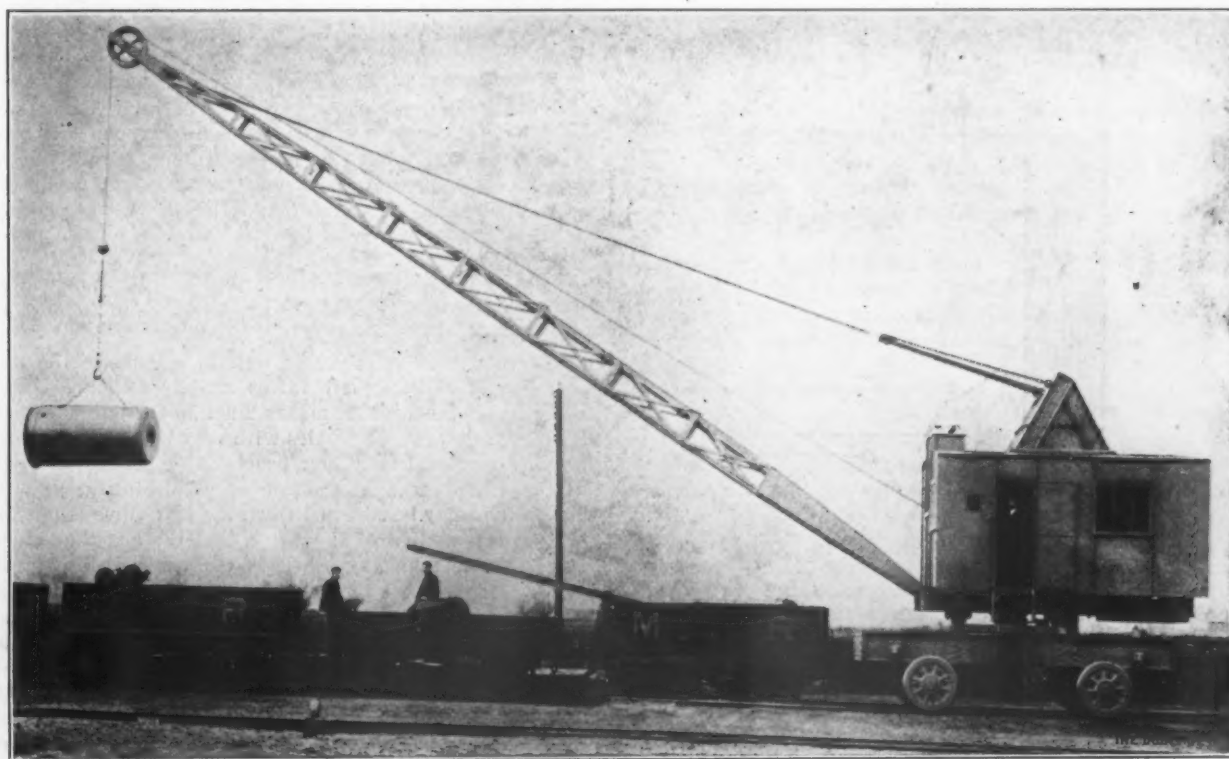


Fig. 2.—A Side View of One of the Jib Cranes, Showing Its Great Radius of Action.

Pennsylvania bituminous coal district who had not signed a scale agreement, held here on Friday, July 13, an agreement was reached. The operators agreed to pay the men the scale posted at the mines on April 28 of this year, giving an advance of 5.55 per cent. for pick and machine mining and 5.85 per cent. increase for other work. Both sides agreed that the mines should be open to union and nonunion men, that there should be arbitration in settling differences between owners and men, and that the deductions for a check weighman's fund should be optional and only upon written authority given by a miner. The conference represented about 50 companies or individuals engaged in mining coal in the counties of Clinton, Clearfield, Center, Cambria, Clarion, Indiana, Blair, Huntingdon, Elk, Tioga and Jefferson. The miners were represented by John Mitchell and other officers. There was practically no discussion over the scale, but the other provisions of the agreement which was signed by all and which are to go before a convention at Clearfield, Pa., caused much talk.

The declaration for the open shop is a victory for the operators, as it is absolute, while the adoption of the clause for arbitration is highly important, as it will tend

shall be made, first, through the local management at the mine and the Mine Committee, and failing in this the matter shall, second, be presented to the general manager or owner and the district officers of the United Mine Workers of America, and if settlement is not reached with said general manager or owner and district officers the question shall then, third, be referred to a permanent board of arbitrators, consisting of two miners, or their representatives, and two operators, or their representatives; they jointly failing to agree shall appoint an umpire, who shall be neither a miner nor an operator, but whose decision shall be final in the interpretation of the question under this agreement.

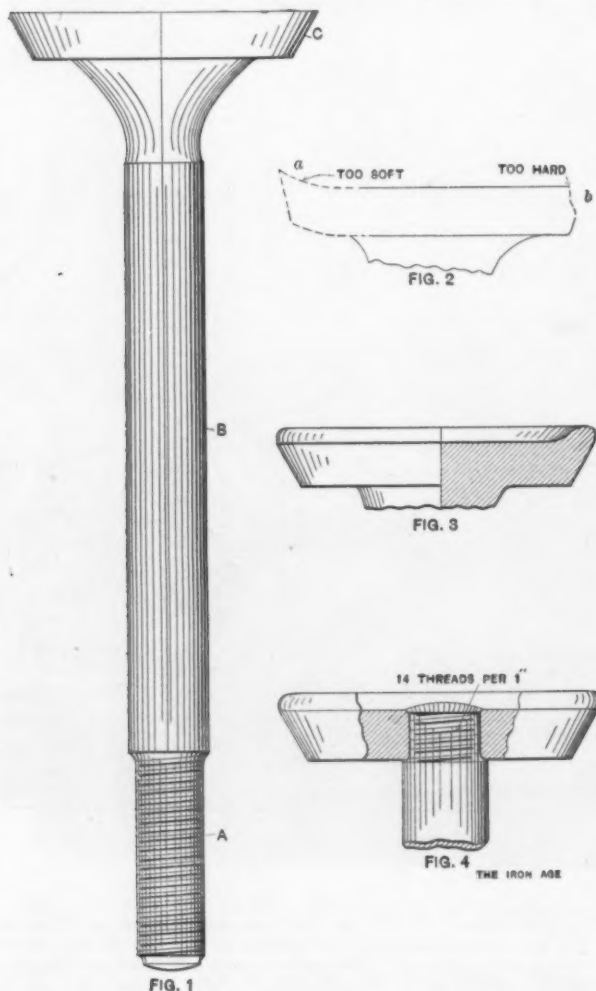
The settlement of the differences means the return to work of over 30,000 men in mines, at coke ovens and on railroads in the Clearfield region, all of whom have been idle since April 1.

The Flinn differential steam trap is now manufactured by the B. F. Sturtevant Company, Boston, Mass. This trap, which is of the vertical standpipe, water-seal type, handles water at any temperature and any pressure up to 300 lbs. Being unaffected by motion or inclination it is especially adapted for marine and railroad use, although applicable for draining steam, air and gas pipes under any conditions.

Gas Engine Valve Construction.

BY H. S. BROWN.

In designing machinery it is important to consider each detail in the light of the service or duty required of it. Too often the inventor, anxious to achieve the end sought in the machine itself, neglects the correct designing of its parts, as a consequence of which the machine is no sooner completed than it has to be redesigned. It may be that on trial some detail gives out, or it may be only that some difficulty in manufacturing has not been foreseen. Either is sufficient to discourage the capital the inventor is endeavoring to interest. What is required is evidence of the ability of the machine to produce on a large scale. The writer has known of numerous cases where large expenditures were required to restore confidence after failure from defective design in the detail of machines which were perfect in principle. Proper attention to these details would have meant complete success. As an instance of the right sort of de-



A Typical Inlet and Exhaust Valve and Suggested Details.

signing he has in mind a machine that required 15 cars to transport it. There was not a dollar of extra work required, and after a service of about 20 years the machine is still in very satisfactory operation.

To design and lay out an inlet or exhaust valve for a gas, gasoline or oil engine, consideration should first be given to the requirements of each section. Allowances must be made for the forces tending to fracture the material of which the valve is made and the tendencies to destroy surfaces of bearings or seats. A typical valve might appear as shown in Fig. 1 of the illustration. Beginning at the thread end, this should be of a composition such that the thread will not change its form and thereby cause the nuts to tighten or loosen when the valve is in service. If collars are substituted for nuts the stem should not upset and make it difficult to remove the collars for cleaning and repairing. If an analysis does not show a proper proportion of the elements it

may be expected that the stem will be likely to bend under the stress of service and cause the valve to remain open from friction in the guide. Of course the dimensions are to be considered as well as the composition. A bending of the stem would tend to throw one side of the disk or valve proper off its seat, thereby destroying the compression to a degree that would result in a poor performance of the engine.

The expense of machining the valves must also be borne in mind to keep down the cost, not only of the complete engine, but the selling price of the valve when ordered for repairs. A great deal of new business has been lost simply through the high prices charged for detail parts. Valves of this style, with stems up to 1½ in. in diameter, may be finished in a monitor or turret lathe at a very low figure if the stock is suitable in composition. For the thread end A of a valve the following composition is recommended:

	Per cent.
Carbon	0.16
Silicon	0.11
Sulphur	0.034
Phosphorus	0.029
Manganese	0.51

The next section to be considered is an important one—the body and wearing section B. On it depends the keeping of the valve in position so as to seat squarely while in operation, without noise, caused by lost motion in the guide. This section should be as hard as possible without sacrificing other important features. A fairly high grade of tool steel, with, say, 0.65 per cent. carbon, will give good results, as it may be hardened and ground true to gauge. The uncertainty of lubrication at this point in the engine makes a hard section desirable. In the making of these valves it is good practice to rough out all parts to within about 1-32 in. and then anneal the stock, before grinding to size, to remove all strains that may cause trouble when subjected to the temperatures of the engine cylinder and valve chest.

At this point it might be well to emphasize the importance of finishing all valves strictly to gauges and make them standard. It means much to the purchaser, as it allows him to make repairs with very little loss of time. Equally essential is it that provision be made for wear in the valve chest by the use of a bushing ground to gauge, that may be renewed when the new valve is put in.

The last section of the valve, and the one that gives more trouble than any other, is the valve disk. If the material is too soft the edges will turn up, as shown at a in the detail, Fig. 2; if too hard they will crumble and break off, as shown at b. There is also a tendency to cutting at these points from the action of the exhaust gases, which will be considered later. To reinforce the disk edge and give strength to resist destruction a change in design, as shown in the second detail, Fig. 3, will provide additional stock, but not enough to materially increase the weight of the valve, a matter of moment in a high speed engine. Good results for medium speeds are secured with a composition showing:

	Per cent.
Carbon	0.12
Silicon	0.11
Sulphur	0.041
Phosphorus	0.053
Manganese	0.34

To construct a valve as described above recourse is had to electric welding and grinding for finish. A valve may be built up, as shown in the lower detail, Fig. 4, that will give good service and at small outlay. The disk may be made from a good close grained gun iron and the stem from steel showing a composition of

	Per cent.
Carbon	0.16
Silicon	0.11
Sulphur	0.034
Phosphorus	0.029
Manganese	0.51

The body or guide may be case hardened, leaving the two ends soft. This can be readily accomplished by packing the stems in hardening boxes, with the hardening compound surrounding the bodies only and the ends covered with clean sand. The thread in the disk should not be coarser than 14 to the inch in valves up to about 3 in. in diameter. The disks should be put on hot and the stem riveted over.

These valves are often forged from a bar of diameter equal to the diameter of the disk. This is not a good practice, as the breaking down of the stock under the hammer will tend to fracture the neck of the valve by stretching. It is better to use stock about $1\frac{1}{4}$ in. in diameter for, say, a 3-in. valve, and upset the disk in a heading machine, one heat for roughing and another for finishing. Then the body or stem should be drawn to size in a die. In this style of valve the disk may be made of steel, drop forged, or from a bar turned in a turret lathe, using great care in selecting the stock.

The latest practice in the making of these valves, and one that is full of promise, is to use a $3\frac{1}{2}$ to 5 per cent. nickel steel. Corrosion or cutting away is almost entirely prevented by the use of nickel steel. Great care should be taken in selecting the stock and a strict observance of the specified analysis required. The forging is also of the utmost consequence, as a lot of work may be destroyed by not understanding the treatment required. It is very much better to buy the forgings from companies that produce the steel from the raw material until a proper knowledge of its handling has been acquired by the foreman blacksmith.

Finally, the valves should be ground only on a grinding machine whose reputation is beyond question. In fitting the valves to the chest no scraping should be done on the disk. The seat in the valve chest should be fitted to the valve.

Central and South American Notes.

SAN JUAN, C. A., July 2, 1906.—Many Europeans are doing their best to injure American business in Spanish America by pointing to the beef scandals, insurance exposures, &c., forgetting all the while that a nation which is strong enough to uproot such a system and expose it is much safer in business and otherwise than one which conceals it.

The elections in Chile will most probably pass off peaceably and much of the railroad work in the southern section of the country will be taken up with vigor. Cattle and grain are the chief products and fully \$50,000,000 have lately gone into these two lines of business. The promoters expect to build a series of mills and elevators on the American plan, and as soon as the Trasandine railroad is finished across the Andes from Valparaiso to Buenos Aires in Argentine they expect to have a lively world trade. These people are active, intelligent and will bear watching.

All Latin America is greatly interested in the Panama Canal, for the people believe it is at last being put on a business basis, and the work is certainly progressing. Workmen are arriving from different parts of Spanish America, Jamaica, Trinidad and other parts of the West Indies. These people generally stand the climate well.

There is a revival of interest in the gold, copper and tin mines of Ecuador, and a British-German syndicate is having a preliminary survey made for a railroad which will take in the Esmeraldas region. Both Quito and Guayaquil will gain by this, but the latter will never do much till sanitation and dredging works are carried out in the bay. It is the chief port between Panama and Callao and will eventually be connected with the Pan-American and Amazon railroads. The people are not much given to business, most of the business of the country being in German and British hands.

A large number of Germans are reported to have left Hamburg and Bremen for Santa Catherina, Pelotas and Puerto Alegre, in southern Brazil, in connection with the large trading posts in that country. German firms have concessions for two new railroads there to connect with the Uruguay and Argentine systems in the River Plate country. The exports are mostly cattle, hides, wool and grain. The interior is heavily wooded, and mines of iron and copper are beginning to produce fair returns. The British, German, French and Italian liners are now touching at the Rio Grande ports.

An Austrian and an Italian line of steamers will be added to the score of main lines running from European ports to Buenos Aires, Montevideo and Rosario. The trade

of the River Plate is increasing by leaps and bounds. Government securities are very high, and the outlook is good.

High Prices for British Steel Rails.

The maintenance of the present absolutely and relatively high prices for steel rails in Great Britain is causing and will continue to cause a loss of business to British rail manufacturers, in the opinion of the *London Iron and Coal Trades Review*. That journal discusses the situation as follows:

The truth is and has for some time been that the British rail trade is more or less playing into the hands of its American rivals. It is true that the Americans have established a kind of working arrangement with European rail manufacturers whereby there is a more or less definite understanding as to partition of markets, but that arrangement is not binding on all rail manufacturers, because all of them do not recognize it. Nor can it be expected to bind European manufacturers in the sense of giving to the Americans the command of markets on the American Continent, so long as England naturally undertakes to fill rail contracts for the railroads of her own Dominion of Canada. Indeed, such an understanding as that named must be both unstable and highly elastic, while prices differ as they do at the present time.

The prospective consumption of railroad material in Canada during the next few years must be very large indeed. The next three to five years are expected to witness a consumption of about 1,000,000 tons of 80-pound rails, in addition to 300,000 or 400,000 tons of iron and steel for cars and locomotives, switches, trestles and bridges. Not less than 7344 miles of new lines will probably be called for previous to the year 1908, or 1909 at latest. This is a heavy programme. What manufacturing country is likely to contribute the lion's share of the work? There are three main competitors. The Canadians themselves not unnaturally desire to be in the forefront of it, and it is probable that they may be so. They produced nearly 200,000 tons of steel rails in 1905, and for the current year their rail output is certain to be much larger. The balance that they themselves cannot produce will, of course, be divided between Great Britain and the United States, but in order that Great Britain may have a fair chance in the competition her prices should be more or less on all fours with those quoted by her great competitor, and it is common knowledge that nominally at least they are not so. We say nominally because as a matter of fact the United States possesses and always is likely to do so a material advantage over our own country in being at the back door, so to speak, of the principal Canadian markets, many of them in the interior of the country and almost inaccessible to British merchants and manufacturers without heavy cost.

The observations just applied to the Canadian market apply to others, in so far at least as price is concerned, and hence we suggest whether our rail makers would not be well advised in less rigidly adhering to the regulation price when only modified figures are likely to secure orders. The orders taken at Glengarnock, at Bilbao and at Witkowitz were unexpected cases of disagreeable surprise, which may be repeated from equally unexpected quarters. We make this suggestion with much deference because, while the British rail manufacturer no doubt knows his own business best, it is equally true that the looker on sees most of the game. And we would point out that while the exports of British rails in the first five months of 1906 were 55,000 tons in excess of those of the corresponding period of the previous year, nearly the whole of the increase was in respect of Indian demands, which are at all times specially favorable to British trade, while in a perfectly neutral market, like the Argentine, we lost ground to the extent of 32,000 tons. The capricious fixing of prices and their autocratic maintenance at a determined level may be an excellent policy when the field is your own, but it is likely to be doubtful wisdom in cases where it either retards, or is likely to retard, the flow of orders, by which the volume of business is increased and money is freely and largely circulated.

Modern Pipe Founding.*

BY H. A. CROXTON, MASSILLON, OHIO.

Pipe founding as practiced in this country at the present time, while showing a decided improvement over some of the methods pursued in the past, strange to say does not differ materially from the old fashioned way of making pipe. There is no branch of the foundry business that is so dependent on tonnage for profits. Within 10 years the required amount which it is necessary to produce to enable the manufacturer to compete on a satisfactory basis has changed from 100 tons per day to 200 tons per day.

Probably the most important item to be considered in the cast iron pipe business to-day is the general outline of the proposed plant. My remarks will be based on a pipe foundry with a daily capacity of 200 tons of finished product, or more properly speaking, a yearly capacity of 60,000 tons. The site should contain not less than 40 acres of ground, with buildings centrally located. The modern pipe foundry handles in and out 500 to 600 tons of material every day and the handling of such a vast tonnage must be at the least possible cost. For this reason, starting with the pig iron yard, which should be on a level with the cupola deck, the plant should be laid out on a 1 per cent. grade line down to the finished product track, which should be depressed. When you stop to consider that a modern pipe foundry produces and finishes complete a piece of pipe every 40 seconds in the day, you will have a good idea of the nicety with which each department must do its work.

The Choice of Pig Iron.

The pig iron mixture required in making pipe is one that does not always receive the attention it deserves. The writer was one of the first pipe makers in the United States to establish a complete laboratory, and it has been our experience that iron mixed by a chemical analysis without paying any attention to fracture will produce better and surer results than any of the old fashioned methods. We aim to use not less than four different brands of iron in our mixtures, which nearly eliminates the evil effects that might arise from any one brand running irregular in its analysis. Each car of iron is analyzed before using and is handled accordingly. The coke is also analyzed, particular attention being paid to sulphur and ash.

Men connected with the pipe foundry business have always been early risers. The majority of pipe foundries in the United States start operations at 5 o'clock in the morning and in about an hour afterward are ready to pour, which operation continues without interruption until about 2 o'clock in the afternoon.

Flasks and Cores.

The flasks in which the pipe is cast are made of cast iron, approximately 13 ft. long with eyes in the center. These eyes are so placed that the flask is in good balance. After each pipe has been cast, by the use of an overhead traveling crane the flasks are taken out of the pit and opened up over a pair of skids, thus permitting the sand to drop into a shallow pit provided for this purpose while the pipe is rolled out of the main building. All the flasks are rammed up on the day before casting. The molds are dried over night and should be dried thoroughly, as skin dried molds are very liable to cause trouble, especially after standing in the pit for several hours before being cast.

In our foundry we make three pieces each of 3, 4 and 6 in. pipe in a flask; two pieces each of 8, 10, 12 and 14 in. pipe in one flask; pipe 16 in. to 72 in. inclusive is cast singly. The cores are made in a "strike" and on sizes up to 12 in. the bar is made of wrought iron pipe while on sizes above 12 in. the core bars are made of cast iron. For 3-in., 4-in. and 6-in. pipe loose hay is wound on the core bar until it is thoroughly covered, after which the first coat is put on, averaging about $\frac{3}{4}$ in. in thickness and

varying with the different sizes of pipe to be made. After the first coat is put on the bars are loaded on a car with an electric traveling crane and then dried in ovens conveniently arranged to receive the cars. About 11 o'clock in the morning the bars are taken out of the ovens and put in the finishing "strike" and the second coat is put on. Before the bars are moved from the "strike" the cores are covered with blacking and they are then replaced in the ovens to dry over night. To insure a perfect pipe it is necessary that the cores should be placed the following morning in exact central positions in the molds. To do this we use a tapered socket on the chill plate and the same taper is made on the core. At the top of the flask we use a slip socket core, which drops into the tapered mold at the top, and as it has a centrally located opening it insures the top of the core being held in exact central position.

After Casting.

After the pipes have been cast they are allowed to cool for a half hour, after which they are taken out of the flasks and permitted to roll out of the building to the cleaning department. About half of the material which is taken out of the pipe in the shape of burned core is taken back to the mud mills and ground over; the balance goes to the dump. With proper care and skilled workmen there is very little to do in the way of chipping. The gates must be knocked off and any imperfections which show must be removed. For this purpose we have tried compressed air, but it has been our experience that a good chipper with chisel and hammer can clean more pipe than the most expert man with a pneumatic hammer. After the pipe is properly cleaned it is run into an oven, which is built on the runway, and operated with counterbalanced doors. The oven is long enough to permit a 72-in. pipe to make one complete revolution in going through. In making this revolution the pipe has been heated sufficiently to permit of dipping it in tar, and after the dipping, which is done by means of an electric elevator, the pipe is rolled out on skids. In about 10 min. it is cooled sufficiently to make the tar set, giving a coating which will forever preserve the pipe after being laid underground. After the dipping or coating process each individual pipe is weighed on a pair of scales built in the line of the runway, and each pipe is then tested hydrostatically to 350 pounds per square inch.

The specifications and requirements of the largest users of cast iron pipe have become so rigid in the past few years that while they require a test of 300 pounds per square inch it has been our practice to test from 350 to 400 pounds. If the pipe breaks at the mill it is simply a matter of remelting the scrap, while if it breaks in the trench it causes all sorts of trouble and usually quite an expense account. There is a moral obligation which makes it necessary for all pipemen to replace any defective material, and while in a great many cases the cause is one for which the pipemen should not be blamed, at the same time there is very little to do other than settle the contractor's bill for damages.

After testing the pipe is rolled into cars on the depressed track; if not shipped at once it is handled by the locomotive crane and skidded on the yard for future orders.

Crane Equipment.

Of the mechanical outfit of a pipe shop the three-motor traveling crane is the most important. The cranes which we are using are of our own design and are built especially for pipe work. One crane is required to each pit where the square pit is used, and two cranes are required if the circular pit is used. The square pit has decided advantages over the circular pit for the reason that a straight line is the shortest distance between two points. On the square pit the hook of the traveling crane can drop in approximately a straight line from any point to a desired point in the pit; with a jib crane this is impossible. The crane runners must be more skilled than in any other line of manufacture with which the writer is acquainted. We have tried crane runners who have come from the largest Eastern steel mills with the best recommendations, and have found that they are unable to operate pipe shop cranes satisfactorily.

* A paper read at the convention of the American Foundrymen's Association, Cleveland, Ohio, June 6, 1906. Mr. Croxton is general manager of the Massillon Iron & Steel Company, Massillon, Ohio.

Probably the most important feature in the operation of a cast iron pipe foundry to-day is the founder's ability to establish a first-class organization, including all the skilled workmen required. Then he must be able to run his plant to its utmost capacity every working day in the year. There is a heavy overhead charge in the making of cast iron pipe which amounts to about \$2 per ton. A full capacity permits the absorption of this charge on a satisfactory basis, while a small capacity in slack times would make the cost of production so high that the material could not be sold on a competitive basis.

The refuse from a cast iron pipe foundry is also a matter that requires serious consideration. In our plant we have about 80 tons of refuse a day to take care of and unless the shop is properly arranged and some provision made to dispose of this it means an additional item of expense.

The wear and tear, or more properly speaking depreciation, of a pipe foundry is extremely heavy, and I know of no other line of business that so well illustrates this as blast furnace operation. It is our policy to write off 50 cents per ton from the plant each year as depreciation and in addition to that we allow 50 cents per ton for repairs. While this may appear excessive to some of you it has been our experience that it about covers the exact facts.

The Armor Contract Divided.

WASHINGTON, D. C., July 17, 1906.—The Secretary of the Navy has awarded to the Midvale Steel Company one-half and to the Bethlehem and Carnegie companies one-fourth each of the 7300 tons of armor plate for the new battleships South Carolina and Michigan, for which bids were recently opened. In making this award the Secretary has ignored the rule under which the entire contract would have gone to the lowest responsible bidder, but his action has been taken with a view to protecting the interests of the Government, which, in his opinion, require that two or more armor factories should at all times be in running order.

As soon as the figures were known the officers of the Carnegie and Bethlehem companies made representations to the department in the effort to obtain a share of the contract, stating that unless awarded a part of the contract they would be obliged to close down their armor factories and discharge a large number of employees. They emphasized the fact that if the Carnegie and Bethlehem plants were put out of commission the Government would be dependent for armor upon the most inexperienced armor plate manufacturers in the country. Being more desirous of keeping their men employed than of making any money out of the proposed contract they offered to take a part of the work at the same prices submitted by the Midvale Company. President Harrah of the Midvale Company protested vigorously against any division of the contract. He insisted that his company's bid being the lowest and the company being in every way responsible it should have the entire award. He admitted that his company was slightly behind in its deliveries on a previous contract, but insisted that the delay was only temporary and offered to give a bond in any reasonable sum for the faithful performance of the new contract.

Secretary Bonaparte's Reasons.

After carefully considering the question from all points of view Secretary Bonaparte decided to divide the contract, as above indicated, and set forth his reasons in the following interesting statement:

The act governing the award of contract for the armor for the battleships South Carolina and Michigan contains the following provision:

"Armor and Armament.—Toward the armament and armor of domestic manufacture for vessels authorized, \$15,145,000; provided, that no part of this appropriation shall be expended for armor for vessels except upon contracts for such armor when awarded by the Secretary of the Navy to the lowest responsible bidder, having in view the best results and most expeditious delivery."

This provision makes it illegal for the Government to use the appropriation in manufacturing armor itself and likewise forbids the purchase of armor abroad. American armor plants must, therefore, furnish all the armor to be paid for out of the

appropriation in question. Of these plants there are but three, known as those of the Carnegie Steel Company, the Bethlehem Steel Company and the Midvale Steel Company, respectively. All of these companies submitted bids for the armor needed in the case of the above mentioned two battleships. The bid of the Carnegie Company amounted in the aggregate to \$2,732,560; that of the Bethlehem Company to \$2,813,568, and that of the Midvale Company to \$2,555,470. The aggregate quantity of armor to be delivered is 7388 tons, divided among four classes. The bid of the Midvale Company is the lowest, not only in the aggregate, but for each one of the four classes. All of the bids, however, are lower than any price heretofore paid by the Government for the like armor, and lower, so far as the department is informed, than is paid by any foreign Government.

Would Have to Shut Down.

The department is advised that both the Carnegie and the Bethlehem companies will be completely out of work for their respective armor plants within a short time unless they obtain some portion of this contract and that the plants in question will be, unavoidably shut down and the force therein employed discharged and scattered in the contingency mentioned. This statement seems to be admitted as true by all parties interested. The contractual relations of the Government with the Midvale Company have been hitherto satisfactory, but some doubt has been entertained as to its ability to comply with its existing contracts, and it is, in fact, slightly behind the time originally fixed in its deliveries, although the evidence before the department does not justify the statement that it cannot comply with the terms of a contract to manufacture and deliver the whole of the armor in question, and it avers and offers to guarantee its ability so to do.

The Secretary of the Navy is convinced that the best results would be attained in this case and the most expeditious delivery of the armor in question would be secured if the contract were divided between the three bidders. It seems to him clear that it would be against public policy and the best interests of the naval service, and, more especially, would seriously affect the assurance of good results and expeditious delivery of materials under this particular contract, if the Government were to find itself obliged to trust to a single armor plant to supply its needs, all American competitors having retired, at least temporarily, from the business, and the purchase of armor abroad or its manufacture by the Government itself being at present forbidden by law.

Division of the Contract.

The Carnegie and Bethlehem companies are willing and have offered to reduce their bids to that of the Midvale Company, and to take, at the prices thus fixed by their competitor, any portions of the contract which may be assigned to them; and it seems clear to the Secretary of the Navy that, in the exercise of the discretion reposed in him by the act, it will be advisable to divide the said contract, assigning one-half thereof to the Midvale Company, at its prices, and one-fourth thereof, at the same prices, to each of the two other companies, it being his judgment and belief that, to attain with certainty the best results and most expeditious delivery, the Midvale Company should be properly assigned one-half of the contract, but no more, and, if practicable, at the same prices, the other half should be assigned to its two competitors.

The department has felt in this case very serious concern by reason of the language of the provision requiring all contracts to be awarded "to the lowest responsible bidder." If these words stood alone the department would hesitate to take action which might be construed as amounting to a finding on its part that the Midvale Company is not a "responsible bidder," but it thinks the qualification as to responsibility must be read in connection with the further language of the proviso, "having in view the best results and most expeditious delivery." It holds the Midvale Company to be the lowest responsible bidder, having in view the above mentioned ends prescribed by Congress, to the extent of one-half of the present contract, and it awards one-fourth thereof to each of the two competing companies, their bids having been reduced to the figures of the Midvale Company, as next entitled, and equally entitled relatively to each other, under the terms of the law, with a view to the best results and the most expeditious delivery.

It is therefore ordered that the contracts be awarded as nearly as possible in accordance with the terms of this memorandum.

All Authorized Armor Now Awarded.

There will be no further awards of armor plate until Congress has approved the plans for the single big battleship which the Secretary of the Navy has been authorized to have prepared under the provisions of the naval appropriation act, which became effective on the 1st inst.

W. L. C.

The Buffalo & Susquehanna Iron & Steel Company last week received the record cargo of iron ore for the port of Buffalo to date—10,269 gross tons from Escanaba—on the steel ore carrier Charles Weston.

The Ernst Wiener Company, 66-68 Broad street, New York, manufacturer of industrial track, cars and equipment, has opened a branch office in the Gazette Building, Pittsburgh, Pa., in charge of Paul Muller.

Improved Thread Rolling Machinery.

An interesting pamphlet on the "Art of Screw Thread Rolling" bears on a subject of so much interest that permission has been sought and obtained to use it freely in the preparation of the following. The introduction is historical and shows conclusively that the process is an old one. A machine and dies for this work, dating back to 1851, are on exhibition in South Kensington Museum, London, but even before that, according to an authority at the works of the Russell & Erwin Mfg. Company, New Britain, Conn., as early as 1831, wood screws were produced by the cold heading process, the slot being formed in the head at the same time that the upsetting was done, and the screw threads rolled. Of course, these screws did not have the modern gimlet point, but it is an evidence that the later manufacturers of this useful little article had to confine their improvements to the machinery for producing, rather than the article itself.

It must first be clearly understood that a screw thread rolled on wire makes a screw which is larger than the wire. The metal being incompressible is simply cold forged into different form. When the V-shaped lines of the die are forced into the blank, part of the metal is displaced in the form of a burr, the material from the valley forming a hill on either side, while the center of the wire is not disturbed. This action is illustrated in Fig. 1, which shows the result after one revolution against the die, and the relation of the screw and die at the finish.

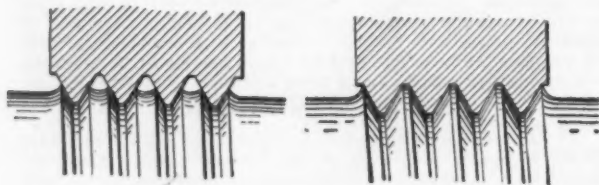


Fig. 1.—The Rolling Partly and Completely Accomplished.

A simple illustration of the action of a thread rolling machine may be made by rolling a pencil between the palms of the hands or, better still, by placing a screw between two strips of wood and moving one parallel to the other while pressing the two together, causing the screw to roll between them. The screw only moves along half as fast, or as far as the moving piece. An examination of the surface of the wooden strips will show a series of slanting parallel lines made on both by the sharp points of the screw thread. It will be appreciated at once that if this process is reversed by having proper grooves in the surfaces of two hardened steel plates and moving one over the other with sufficient pressure a round wire rolled between them may be formed into a screw.

Looking at the face of two such thread rolling dies, when out of the machine, the lines on both will appear about as shown in Fig. 2, if designed to roll a right hand thread. For a left hand thread, the lines will slant in

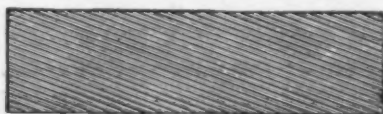


Fig. 2.—The Surface Appearance of a Right-Hand Die.

the reverse direction, but in either case the lines are always inclined in the same direction on both dies and may therefore be cut at the same setting in the milling machine. When a pair of dies are placed face to face the lines slant in opposite directions, as they should.

The relation of these lines on the dies to the screw being rolled are best illustrated in Fig. 3. It will be noticed that the top of each thread on the screw C in the die A is exactly opposite the bottom of the opposite space, and this relation of the screw and die must be exactly maintained at all points during the passage of the screw between the dies. For this reason, it is im-

portant that the wire be started between the dies at exactly the right instant, so that when the blank has

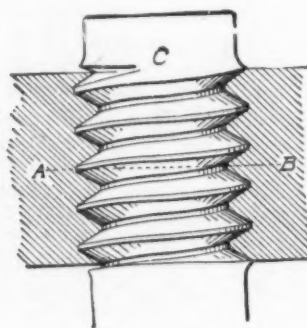


Fig. 3.—The Relation of the Dies to the Work and to Each Other.

made a half revolution the lines produced by one die will exactly meet those made by the other. The means by which this may be accomplished will be described later.

In rolling a thread, since the metal is not compressed but simply re-formed, the wire used must not be too large or the screw will be oversize—nor too small or the screw will be either undersize or not fully threaded. In practice, from 0.003 to 0.005 in. is all the variation allowable in the size of a wire for a $\frac{1}{16}$ or $\frac{3}{16}$ standard screw, and proportionately less on smaller sizes.

In making common rivets on a heading machine the dies are allowed to wear to quite an extent before they are condemned, but for blanks on which a thread is to be rolled the life of a die is much shorter, because of the necessity for accuracy in the product. As most of the rolled thread screws are made from headed blanks there must exist an intimate relation between the header and thread roller. For the best work a liquor finished soft steel wire is recommended, since it produces better results with less wear on the dies of both the header and the threader. The increased cost of good and accurate wire is more than offset by the saving in the wear of tools.

Fig. 4 will make clear several points which should

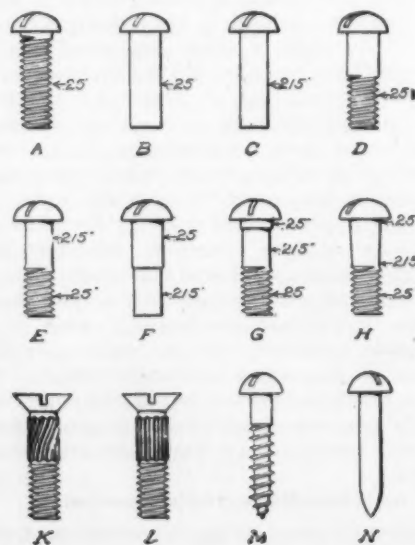


Fig. 4.—Screws and the Blanks from Which They Are Produced.

be understood in connection with rolling screw threads. A shows a finished $\frac{1}{4}$ -in. round-head machine screw, with the threads extending up close to the head. Such a screw may be made in two ways, either from a $\frac{1}{4}$ -in. blank, B, by cutting, or from a 0.215-in. blank, C, by rolling the threads. By the latter method less material is used and more pieces can be rolled in a minute than can be cut.

The general form of a standard round-head machine screw is shown at D, having the body threaded only part of its length. To roll such a screw, since rolling a thread makes a screw larger than the wire on which it is rolled, a 0.215-in. wire would be used, and, as illustrated by E, the unthreaded part will be smaller than the threaded

part. This screw may be acceptable for many purposes, but where the part under the head must fill a $\frac{1}{4}$ -in. hole, the blanks must be made as shown by F. This blank would give the most perfect result, but is more difficult to form in the header. In special cases G might answer, and is easier to produce.

The tapered shank H is a form of blank used by the American Screw Company on rolled thread screws, while for a tire and carriage bolt the forms shown by K and L are frequently used. To roll a gimlet point or wood screw thread, M, the end of the blank must first be pointed, as shown by N, and the rolling dies must have their surfaces and grooves formed to correspond. This is done by special mills and mechanical devices on a milling machine, but a detailed description of these will form no part of the present article, which considers machine screws only.

As before explained, dies for thread rolling have angular parallel grooves in their faces corresponding with the threads of the screw they are to roll. These grooves, properly spaced, may be cut one at a time by using a thread tool in a shaper, but a better and quicker way of cutting the dies is by a relieved mill or hob about $2\frac{1}{4}$ in. in diameter and having a 1-in. hole, with face enough to cut the entire surface of a die at one setting. It is not cut like a tap with a lead, but the grooves are parallel with the ends at a distance apart corresponding with the pitch of the screw which the dies are to roll. In producing a pair of dies, say for a standard $\frac{1}{4}$ -in. screw, having 20 threads to the inch, it is first necessary to find the exact diameter of the wire to make such a screw and from this determine the angle of the grooves and dies. In practice, the following rules are used to get the angle and size of the wire:

First measure the pitch of the screw, or the distance it would advance when turning one revolution into a nut. For 20 threads per inch, this would be $\frac{1}{20}$ or 0.05 of an inch, and having determined this subtract from the diameter of the finished screw the product of the pitch multiplied by one of the following decimals, which, as will be seen, vary with the diameter of the screw:

If screw is smaller than $\frac{1}{8}$ in.....	0.55
From $\frac{1}{8}$ to 3-16 in.....	0.60
From 3-16 to $\frac{1}{4}$ in.....	0.65
From $\frac{1}{4}$ in. and over.....	0.70

Therefore, the pitch, 0.05, multiplied by 0.70, equals 0.035, the exact diameter of the wire required.

To determine the angle of the grooves on the proposed dies: Find the circumference of the wire to be used and note how many times it is contained in 1 ft., thus, diameter 0.215, multiplied by 3.14 equals 0.675 (circumference) and 12 in., divided by 0.675, equals 17.77. In other words, the wire would have to be revolved about 17 $\frac{3}{4}$ times to equal the length of 1 ft. As at each revolution the incline of thread would be 0.05 in 17 $\frac{3}{4}$ revolutions the incline would be 0.88. This would therefore represent the incline per foot at which the dies on the table of the milling machine should be set. Fig. 2 shows the way the lines must incline on the dies to produce a right-hand thread, and the work must therefore be set accordingly on the milling machine.

The earliest thread roller is said to have had two flat grooved dies, one of which was stationary and the other moved over it, under pressure, with the wire between them. Other methods of construction have been used, a notable example being that in which both dies reciprocate in opposite directions, thus leaving the axis of the rolled wire stationary. In another form one cylindrical die acts against an internally curved die.

On the principle of the original machine, as showing the latest improvements in this line, machines manufactured by the E. J. Manville Machine Company, Waterbury, Conn., are shown in Figs. 5 and 6, the first being the No. 3 hand-feed machine and the second the same machine arranged with automatic feeding mechanism.

Briefly, the machine consists of a massive frame casting supporting a broad and long reciprocating slide, between which and the frame proper are placed the thread rolling dies. Since the success of such a machine depends

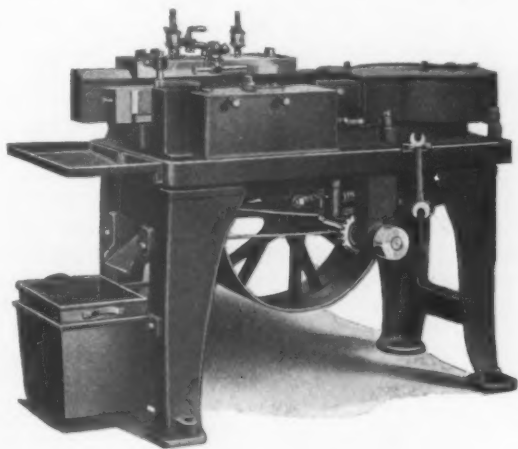


Fig. 5.—The No. 3 Hand-Feed Thread Roller Built by the E. J. Manville Machine Company, Waterbury, Conn.

largely upon its power, stiffness and area of friction surfaces, this slide is made with abundant backing and lubricated by sight-feed oilers, so that very little of the driving power is wasted in frictional resistance. An important point gained by this construction is that the back surfaces of the moving slide receive all the pressure—that is, such as is caused by the work, as well as that due to the direction of pressure of the pitman or connection when forcing it horizontally with a screw between the dies—and even during the return of the slide the pull of the connection keeps the slide back on its seat. On the lower end of the crank shaft is an adjustable cam, by which the pusher which starts the work into the bite of the dies is made to act at the proper instant, and

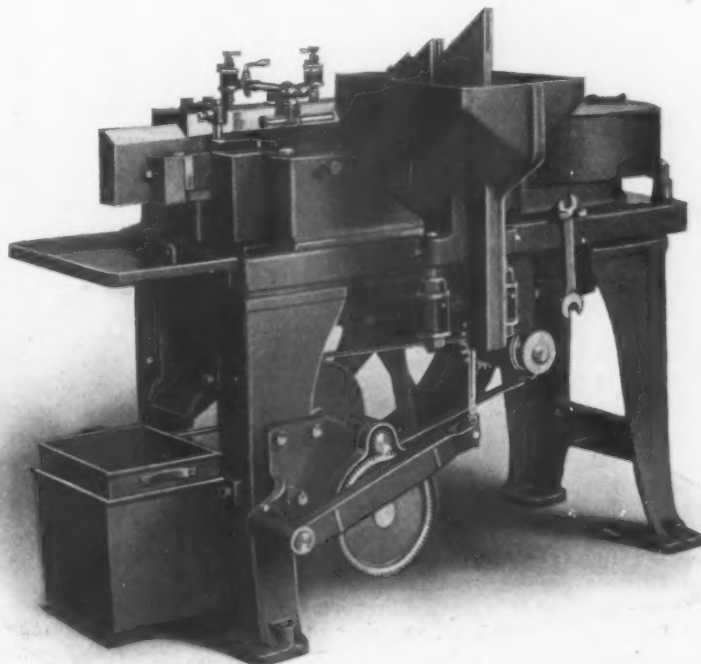


Fig. 6.—The Same Machine as Shown in Fig. 5, Arranged with Automatic Feeding Mechanism.

means are provided so that this push may be positive in its character, or through a spring at the option of the operator.

In addition to the sight-feed oilers there is a system of pump, piping, tanks and drip pans, so that a constant supply of lubricant may be made to flow over the work, thus prolonging the life of the dies and improving the quality of the product, and these additions in no way interfere with the operator, who can still sit close to the machine if feeding by hand. This could not be accomplished if the mechanism were set into a large pan after the manner of the ordinary power screw machines. The projecting pan at the front end receives such oil as may drop from the slide on its forward motion, all overflow being so confined that it reaches the tank through the spout shown, which is also an outlet for the threaded screw blanks. A perforated work pan sets over the tank and rests on a perforated cover plate, so that all oil is drained from the work, and no screws can get into the oil tank, even while the pan is removed.

This construction also permits the same machine to have automatic hopper feed applied, as shown in Fig. 6. Headed blanks are placed promiscuously in the hopper, and all such as may lie properly in the path of the slotted vertical moving slide which passes through the mass of blanks during the upward stroke are lifted by the heads until they reach the upper end of the guides or tracks leading down to the cut-off or separating device near the dies. At this point a single blank is selected and

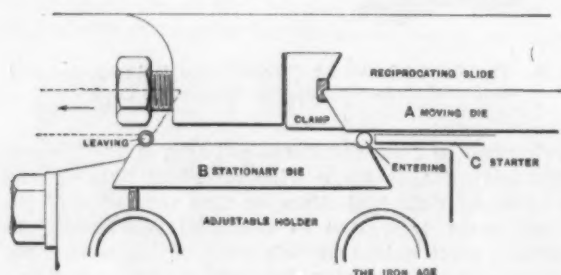


Fig. 7.—Detail of the Working Parts in the Automatic Feed Thread Roller.

properly guided into line with the starter C, Fig. 7, in which A is the moving die, carried by the reciprocating slide. B is the stationary or short die, and is clamped into an adjustable holder which may be moved to and from the die A, as the size of the screw may require. The moving die is shown in one extreme of stroke just as it should lie when a blank is about to be forced between the two dies, so as to start it rolling the instant the die A moves toward the left.

It will be noticed that the threads do not cover the entire face of the die B. Preferably a small surface is left at the right-hand end level with the bottom of the grooves. This makes a perfect feeding point, which always bears the right relation to the dies and saves adjustments. By this construction the operator is enabled to place another blank in position just as soon as the starter C draws back, after having pushed a blank into the bite of the dies, without danger of its being picked up and dragged in by the moving die. As soon, therefore, as one blank is started, another may be placed, and will not be disturbed, but will await the return of the die A, and the proper action of the starter C. The first motion of the starter C pushes the blank squarely against the ends of the threads of the die B, and causes it to assume a perfectly upright position, so as to be started true, which is very important. A cam actuated starter is used, but between it and the adjustable cam means are provided so that either a positive or a yielding pressure may be given to the blank as it is started between the dies. It is merely a matter of choice on the part of the operator and the proper setting of a nut.

Machines of this type are made at present in four sizes: No. 1, for screws $\frac{9}{32} \times \frac{3}{4}$ in.; No. 2, for screws $\frac{3}{4} \times 1\frac{1}{2}$ in.; No. 3, for screws $\frac{1}{2} \times 2\frac{1}{4}$ in., and No. 4, for screws $\frac{3}{4} \times 4\frac{1}{2}$ in. Before long the line will be extended into large sizes, as there seems to be as yet no limit to the practical application of this method of producing screw threads.

The Making of Metallic Films for the Edison Storage Battery.

A process of extreme refinement is that adopted by Thomas A. Edison in the making of the metallic films or scales used in his storage batteries. Interest attaches not so much to the work these films perform in the battery as to the simple and beautiful method of producing them in quantity. These scales are exceedingly thin, are minute in size and each scale is curled. This form was selected for the purpose of insuring contact between the metallic particles themselves and the inclosing pockets. The flake form possessed another advantage in that it exposed the largest possible surface to the action of the active mass. Again, the curled shape of the scales prevents the close packing of the material and maintains an open, porous condition. Crushed particles of metal would answer the purpose, but the exposed surface would then be infinitely less than with thin flakes, and the battery would be very much heavier for the capacity.

To make these films or scales in large quantities was the problem before the inventor. Upon a polished copper plate an exceedingly thin film of zinc was deposited. A film of this character is so thin that it is known among electroplaters as a "blush" of metal. The deposit is made upon the plate in a solution of zinc sulphate or other zinc salt in the usual way. The cathode thus prepared is then washed and placed in a bath—electrolytic—formed of an ammonium sulphate of cobalt. Nickel can be deposited in the same way; or by combining the two solutions in the proportions of 70 per cent. of cobalt and 30 per cent. of nickel, a cobalt-nickel deposit can be produced. This deposit upon the blush of zinc is only about 2-10,000 of an inch in thickness. The plate with its two thin coatings of different metals is then immersed in dilute acid, such as sulphuric or acetic. The acid does not attack the cobalt or nickel film or the combined film of the two to any sensible degree.

The most beautiful step in the operation now takes place, and upon which depends the final success. The zinc is rapidly dissolved by the acid and the cobalt-nickel alloy freed from its base. But the two surfaces of the zinc are thoroughly protected from the acid—by the cobalt upon one side and the copper on the other. The edge only of the zinc comes in contact with the acid; how, then, can the two sheets be separated? The dissolution of the zinc by the acid results in the formation of hydrogen gas, which in escaping forces the cobalt film away from the copper plate. The alloy is detached in the form of small flakes or scales, being pushed from the copper by the hydrogen gas. It is exceedingly brittle; therefore the scales are exceedingly small.

With most metals the flakes would be flat and useless for this purpose, since they would pack too closely and too nearly resemble a dense rather than an open mass. But it is a peculiar characteristic of both cobalt and nickel, and also of the alloy formed of the two, to become detached in curled and not in flat flakes.

It has been found possible to facilitate the stripping of the film of alloy from the zinc by coating the latter with a solution of wax or oil in alcohol. When dry the zinc is covered with a film of wax so thin as not to prevent the proper deposition of the pure metal or the alloy of both through it.

When used in the storage battery the cobalt-nickel alloy has been found to possess advantages superior to either of those metals used alone. It has the good contact secured by the cobalt, while the nickel prevents the cobalt from more than a mere surface oxidation.

The National Association of Manufacturers, 170 Broadway, New York, is distributing copies of an address by its president, James W. Van Cleave of St. Louis, which was delivered at the annual meeting of the United Typothetæ of America at Buffalo, July 18. The address is an interesting discussion of the relations of employers and employees. Mr. Van Cleave is an able exponent of the employers' side of the question. His views are aggressive and at the same time reasonable.

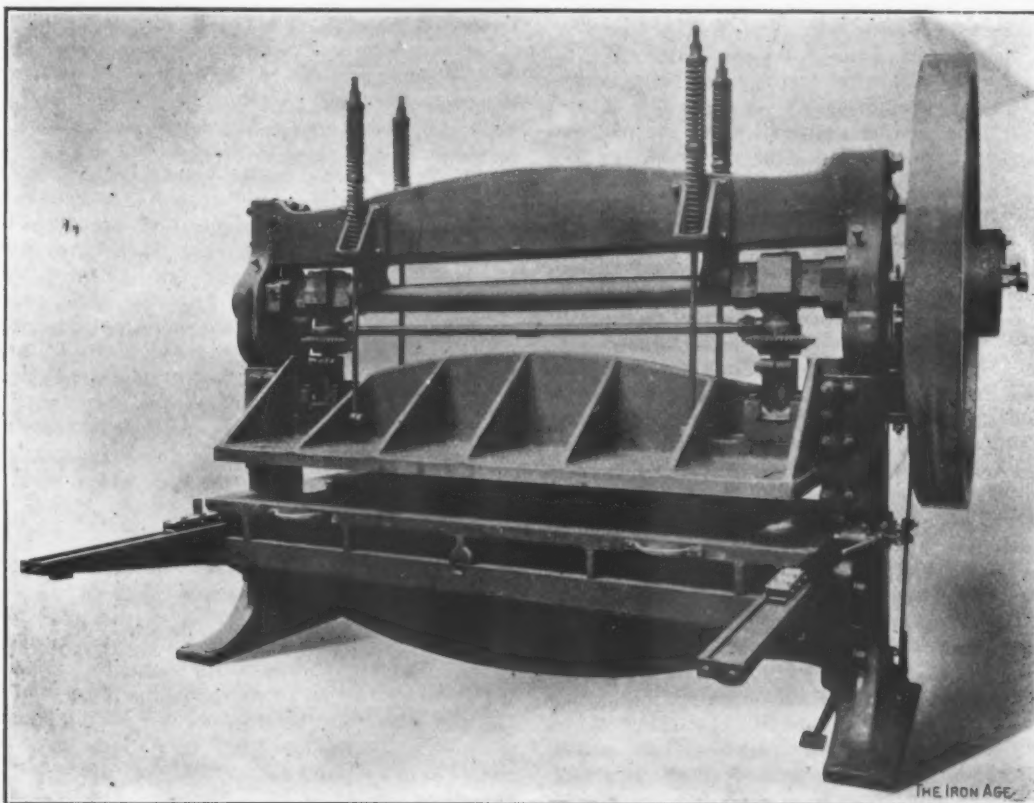
A Special Bliss Double Crank Power Press.

The working of sheet metal was once generally considered the chief function of power presses, but in recent years other uses have been found for them, so that now there is hardly any line of manufacture where they cannot be employed to advantage. The press illustrated is one that has been designed for a special purpose—the trimming of paper cloth and asbestos boards, such as are used in building and engineering work—and was recently built by the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y.

In this press the area of the mandrel plate carrying the trimming cutters, which cut all four sides of the sheet, is $98\frac{1}{2} \times 45$ inches. As the sheets that are to be cut are too large to be conveniently inserted under the cutters in the ordinary manner the bed is provided with a movable table mounted on rollers, so that it can be easily withdrawn or pushed under the slide. After

pensive refinements in the way of high vacua, where a lower thermal result would have given a better accounting on the balance sheet. Another feature of turbine operation which is not generally recognized is that under all circumstances it is the velocity in the steam which produces the result in rotation of the turbine and the doing of work through the shaft. The pressure may be great in the passages, but without motion of the fluid no rotation would ensue, for the simple reason that this pressure as such is exerted about equally on both sides of the blades. The fall in pressure along the line of passage of the steam is due to the conversion of the potential energy represented by the static pressure into kinetic energy exhibited in velocity, and the results are due solely to reaction.

Cast Iron in Locomotive Work.—At the thirty-ninth convention of the American Railway Master Mechanics Association, held at Atlantic City, N. J., June 18 to 20,



A Double Crank Power Press Built by the E. W. Bliss Company, Brooklyn, N. Y., Specially for Trimming Asbestos Boards and Paper Cloth.

each operation the table is pulled forward, the trimmed sheet removed and a new sheet laid on the table, with very little loss of time.

No die is used in the press, the cutters being allowed to work against Babbitt strips inlaid in the table. Several thicknesses can be cut at a time. In order to prevent the possibility of the cutter slide coming down before the table is in proper position an automatic clutch lock is provided, which makes it necessary for the table to be located centrally with the slide, before the clutch can be tripped. The slide is counterbalanced by the four steel springs shown, which relieve the shaft of the lifting strain and at the same time serve to steady the stroke and prevent the possibility of backlash.

The distance between the uprights on the press is 105 inches and the area of the top of the table is 45×103 inches. The stroke of the slide is 2 inches. The balance wheel weighs 1000 pounds and makes 70 revolutions per minute. The total weight of the press is 24,000 pounds.

For high thermal efficiency of a steam turbine it is not unusual to sacrifice to a certain extent the true or commercial efficiency of the plant by carrying out ex-

one of the subjects discussed was specifications for cast iron to be used in cylinders, cylinder bushings, cylinder heads, steam chests, valve bushings and packing rings. The following points, among others, were brought out: The wearing quality of the cylinder can be varied greatly by the manner in which the cylinder is made. There are advantages in using dry sand molds and cores. While expensive to make, these insure uniform cylinders. The method of cooling is also a factor in the wearing quality. If a cylinder is poured and stripped of the mold as soon as possible, not permitting the iron to bleed, the result will be a very hard cylinder, one so hard, perhaps, that it cannot be machined. If the cylinder is buried in the cylinder pit for two or three days and allowed to cool, it will come out a very soft cylinder. By the method of cooling it is possible to vary the hardness of the cylinder. If a hard valve sheet is wanted, a good plan is to strip the valve sheet and let it cool quickly and it will chill to some extent. The Committee on Cast Iron was instructed to prepare for adoption by letter ballot a definite form of specification for unbushed cylinders with silicon limits 1.35 to 1.75 per cent., and also for adoption as recommended practice, specifications for bushed cylinders.

Protective Coatings for Steel.*

BY ARTHUR B. HARRISON.

Protective coatings should be divided into three classes: 1. Linseed oil paints. 2. Varnish and enamel paints. 3. Carbon coatings, using solvents that dry by evaporation. The all-important factor in protective coatings for the preservation of steel is their efficiency under conditions of exposure as they are, and not as they should be or as we would like to have them. A vast amount of valuable information has been given as to how steel should be prepared for coating. We may as well face the conditions as they are in practice, knowing as we do that steel is seldom properly prepared for coating and never will be. Mill scale, rust, dampness and even dirt are more frequently covered up than removed before the coating is applied.

For many years this question has occupied the minds of leading engineers, and yet up to the present time it has resulted in little but theorizing and temporizing, and no definite conclusions have been arrived at except that all coatings seem to fail in time. It seems to be the general opinion that there are no coatings that will protect steel against corrosion under all conditions, and yet sooner or later the coating that will serve the purpose best under normal conditions will be recognized as the standard coating for this particular branch of work.

Linseed Oil and Carbon Coatings.

It was stated by the late Edward Atkinson of Boston some years ago that any coating that contained linseed oil and dried by oxidation tended to corrode steel. It seems to me that this should be absolutely determined and if after experiments, tests and chemical analysis it proves to be the fact, it should be so stated, in order that engineers can turn to other channels and by the most thorough investigation in the laboratory and in the field, and under all possible conditions, find a material that when applied to steel will protect it better than any other. If it is true that linseed oil or a coating that contains linseed oil as a vehicle lacks the efficiency and permanency claimed for it, the fact should be determined and announced.

In the past certain weaknesses have been assisted and have developed in connection with the use of carbon coatings; but if results were placed in parallel columns there is no doubt that the efficiency of carbon coatings would be found to exceed by far that of paints containing linseed oil as a vehicle for a protective coating. I know that there are certain inherent weaknesses in carbon coatings due to the following reasons: There is a tendency in such coatings not to oxidize, for the simple reason that generally there is nothing in the material to oxidize. One point advanced by some authorities, who seem to give great weight to it and consider it a weakness, is that the carbon coating fades and becomes gray, due to the action of the sun. But there is one fact they forget, and that is that the manufacturers of carbon coating do not claim that the material is a paint. These carbon mixtures are not put upon the market to serve the purpose of a paint, but as a coating to protect steel. In the one case we have a paint used for color and in the other simply a protective agent, and I believe that in future we should make this distinction. An oil paint upon wood serves first as a colored surface and second as a protective medium, and its failure in either direction would indicate its inefficiency. A coating upon steel, on the other hand, should be simply and solely a protective coating, and the permanency of its color is a trivial and insignificant matter.

We need no microscopic slides on a screen to prove to us that steel rusts. What the engineering world desires to know is this: Steel being received in a rusty condition, what is the best material to apply to it in its normal condition to arrest and prevent further rust? It appears to me that it is only a question of a comparatively short time before this problem will assume a far more satisfactory phase, as I believe its solution has been hampered to a great extent by depending upon chemical

reactions and mechanical mixtures. It is my opinion, further, that we will go back to nature—that we will be obliged to depend upon a natural product.

Paint Compounds.

Many scientific, technical and practical data have been given as to pigments, oil, &c., how pigments should be pulverized to a fineness known as air-floated, ground in pure linseed oil, &c., whereas in practice we find that of the pigments used in paints a great proportion would not go through a 60-mesh sieve, much less being air-floated. Result, inefficiency. There is no such commodity on the market as pure linseed oil. Other seed-bearing plants grow along with the flax and all the seeds are gathered and pressed together. This, however, is not the only adulteration to which linseed oil is subject. Let us take, for instance, red lead, which has been largely used as a preservative coating for steel. In order to obtain the best results and the full efficiency of this pigment it should be thoroughly mixed with linseed oil and kept well stirred while being applied, small quantities only being mixed at one time. This, we know, is seldom done. I have seen some specifications from engineers calling for one helper to stir the red lead for every two brushmen. Other specifications call for the pot of red lead to be stirred between brushfuls when being applied by the painter. This we also know is seldom done.

The same applies to any paint in which the pigment is much heavier than the vehicle, the efficiency being lessened or lost in the application in which the poor quality and kind of brush used is an important factor, wall brushes and cheap paint brushes being too prevalent. In mixing paints I think too little attention is given by the manufacturer to compounding pigments. A pigment may be absolutely inert in itself, but when brought in combination with other pigments chemical or galvanic action may begin and the so-called protective paint becomes a destructive agent when applied to the metal.

Experiments in New Lines.

At our mill on the water front in Brooklyn, located in the heart of the chemical district, where the atmospheric conditions are probably the most severe of any part of New York, we add our quota to the numerous destructive gases from a battery of calcining kettles; in fact, a large portion of the mill is constantly enveloped in vapor heavily charged with sulphuric acid gas from our kettles. The result on corrugated steel roof sheathing, and in fact any other steel, was simply appalling, as the steel was eaten away in a very short time. We were unable to buy a paint that would protect this metal under prevailing conditions, even for a few months. As it was a case of self-preservation and protection, I started a series of investigations and tests to procure a coating that would protect. As man and science seemed to have failed I went back to nature and procured samples of bitumen, hydrocarbon and asphaltum from all over the world. After hard work, both practical and technical, and scores of tests covering a period of years in laboratory and in field, I selected one of these products, which seemed to have the necessary qualifications to protect steel against corrosion under the most severe conditions.

This material is found in the West and resembles in composition and in many of its characteristics the mineral ozokerite. It is unique among deposits of mineral wax in its adaptability to the formation of a tough, impervious and extremely adhesive coating, with a high degree of elasticity. It lacks the brittleness of many of these deposits and is distinguished from all other deposits of what is commonly known as asphalt by the qualifications just enumerated. By a special process of refining the material can be prepared for the market with a very small percentage of residuum, grit and rock, and at the same time valuable characteristics are preserved.

It is my belief that no coating will protect steel against corrosion which is not absolutely waterproof, in addition to which it should have the following properties: The bond between the metal and the coating should be perfect. It should remain elastic under all conditions of temperature and after having been applied for years. It should be impervious to acids and alkalis and should

* From a paper read at the Atlantic City meeting of the American Society for Testing Materials, June 21, 1906.

resist the action of all gases. The material should be absolutely inert and a nonconductor of electricity.

Some authorities state that corrosion of steel is due solely to electrolytic action. I believe that corrosion is greatly accelerated by the action of the electrolyte, which, as we know, consists of moisture in any form and must be acidulated or saline. We require a coating which will prevent this electrolyte or moisture from coming in contact with the steel. Many oil paints which contain oxide or carbon as a pigment are good conductors of electricity, and a paint having such a conductor among its ingredients is much less likely to protect against electrolytic action.

A Displacement of Moisture.

Moist air tends to impregnate and saturate an oil paint coating on steel more thoroughly than direct immersion, and after the humidity has been dispelled the pigment in such a coating retains the moisture and holds it against the steel for many hours. Having finally dried out it leaves a more or less porous coating, exposing the metal to all the other oxidizing elements. I should like to give to this society the benefit of some of my experiments with this material on steel surfaces which were coated with rust to the thickness of from 1-64 to 1-16 in. As you know, a large portion of this rust scale is moisture. Mr. Wood says: "Rust begets rust, and unless rust is removed from ferric bodies corrosion will continue, even though the surface be covered with a good paint." After coating the surface on which this rust scale was I allowed the coating to remain for 30 days and then removed the scale with a putty knife. Much to my surprise I found there was no moisture left in this scale. My test to ascertain this was made by dropping pieces of the scale into boiling wax, which was at a temperature of over 350 degrees F. The absence of bubbles proved beyond all question that there was no moisture present. Had there been very many bubbles would have been seen.

Another experiment was to coat clean, wet, iron castings with this material, first rubbing off the surplus moisture with a rag and immediately thereafter applying the coating. An examination of these coatings months afterward proved that they were absolutely free from rust. Had the moisture remained on the surface of the iron corrosion must have been the result.

My theory is that this material has such a phenomenal bond and affinity with all ferric bodies that it displaces moisture, and the moisture being driven out comes to the surface with the solvent and evaporates. This same theory applies to the rust scale, as on examining pieces of this scale I found they were saturated through and through with the material, and where the scale was thin had been actually cemented to the surface of the steel.

In practical field tests on this same order one of the great corporations of the country coated some twenty pumps. These pumps were under the bed of a salt river and were used for keeping the tunnel clear of leakage. The pumps being kept constantly in action were much cooler than the atmosphere in the tunnel and condensation was therefore very great; the pumps were actually running with water all the time. The pumps were coated with this material, two men being required for the operation, one to rub the water off the pump with a rag, while the brush man followed him and supplied the coating. The coating set and became hard after an hour and remained on the pumps, protecting them against further corrosion since its application, about a year ago.

In addition, in field tests I have in mind a number of instances where the results have been equally satisfactory and gratifying both to myself and to the interested parties, in the work done in paper and pulp mills, where nothing has stood before; in tunnels, where the blast from the engine and gases were so destructive to all metals; in train sheds, roundhouses and overhead bridges. In none of this practical fieldwork has the material fallen down.

I found many corporations and municipalities refused to use a true carbon coating, even though in efficiency it proved to be the best preservative coating. This was on account of its being black and the fact that they were unable to procure an oil paint of lighter shade that could be applied as a finish coat, on account of the color striking through.

A Carbon Coating Covered with Oil Paint.

After reading the statement made by the late Edward Atkinson I took up first as a pastime and then as a serious proposition the question of the oxidation of linseed oil, having made up my mind that the life of a paint depended upon the life of the oil. The results were very gratifying, because I ascertained by a long series of tests in the laboratory and in the field that I could take linseed oil and by treating it with certain processes could prolong the life of the oil—I will not say indefinitely—but the life of the linseed oil was prolonged and its efficiency increased to such an extent that paint made with it as a vehicle would resist the action of the strongest paint removers, gas drip, benzol, &c., and a paint made with this treated oil would go over a carbon coating perfectly without the color striking through. The co-efficients of expansion and contraction seem to be identical, so that we are now able to furnish nature's pure carbon coating as a preservative coating, on top of which an oil paint can be applied, acting as a decorative coating and at the same time protecting the carbon coating from the rays of the sun, which seem to be its only enemy in nature.

Prolific Tariff Litigation.

The annual report of the Board of United States General Appraisers for the fiscal year ending June 30 last was made public July 16, and shows that litigation between importers and the Government continues to grow notwithstanding the fact that the Dingley tariff is almost in its tenth year of existence. During the past 12 months covered by the report, importers of metals have had an unusually large number of differences with the Treasury Department. In several notable instances, however, the suits tried before the customs tribunal have been so-called "new" cases, instituted by the Secretary of the Treasury in the hope of reversing former decisions of the board and of the Federal courts which were favorable to importers. Among cases of this kind those involving the classification of steel, wool and polished steel stripes may be instanced.

At the present time the number of importers' protests pending before the Board of Appraisers is set down as 84,533, compared with 77,198 at the close of the fiscal year of 1905. The increase in protests is over 7,000, but the report points out that within a short time pending issues in the courts in the form of tests of the tariff schedules may release approximately 25,000 protests raising similar questions now on the suspended files of the lower tribunal. During the last fiscal year the general appraisers visited all of the leading ports of the country for the purpose of taking evidence in customs disputes. The report states that the work of the tribunal is steadily making for uniformity in practice and classifications at the various ports.

The New England Foundrymen's Association held the second of its summer outings at Bass Point, Nahant, Wednesday, July 11. The members and friends went down Boston Harbor by steamer, enjoyed a dinner at the Bass Point House, and afterward passed the afternoon informally. There was no business meeting. The next meeting of the association will take the form of an excursion down Narragansett Bay, under the guidance of the Providence members, this outing, which has become an annual event, being one of the most enjoyable of the gatherings of the members.

The first and final accounting of Charles H. Zug, Charles H. Reid and Horace G. Dravo, liquidating trustees of Zug & Co., Limited, Sable Iron Works, Pittsburgh, was filed in the courts in that city last week. The trustees charge themselves with \$403,704.26 received from all sources from the time the duties of the trustees commenced, and after paying all obligations of the firm have \$44,713 for distribution among the surviving members of the firm. Zug & Co., Limited, have been succeeded by the Zug Iron & Steel Company, which is manufacturing the Sable line of products, consisting of black and galvanized sheets and refined iron bars in iron and steel.

THE IRON AGE

1855—1906.

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Basic and Acid Steel Castings.

A feature of the expansion in steel foundry operations in 1905, as shown by the report of the American Iron and Steel Association, is the large increase over 1904 in the production of basic open hearth steel castings. It is only a few years ago that basic open hearth castings were ruled out of consideration for most uses. But the standardizing of a number of lines of steel castings, such as bolsters, side frames, couplers and knuckles, and the building of steel foundries to engage largely in these particular lines of work, rather than in the miscellaneous jobbing trade, have brought the basic lined furnace forward in a noteworthy way. Generally it has been customary to prefer the acid process for castings that require to be machined. The basic casting has a rough surface as it comes from the cleaning room, the sand being with difficulty removed from the basic metal, and even with more work in cleaning and machining it is hard to make as smooth a casting out of it as is turned out with acid steel. Where new patterns are constantly coming into a foundry doing a miscellaneous line of work, the molding and gating requiring special study for each casting, the observation in foundries making both basic and acid steel is that with the better control of the metal secured by the latter process it is a surer dependence. Fewer imperfections are found in machining and the chances of rejections due to blowholes are lessened. In such foundries standardized work, in which one day's routine repeats that of the day before, will be taken care of on the basic floor. Thus in several lines of railroad work basic castings constitute a larger percentage of the total than the acid product. The American Railway Master Mechanics' Association, however, specifies acid open hearth steel for locomotive frames. Yet some very good frames have been cast from basic steel, though in the matter of finish they are at a disadvantage in comparison with those poured from acid furnaces.

The figures below, taken from the annual report of the American Iron and Steel Association, are interesting as showing a geographical phase of the development of the past year:

Production of Basic and Acid Steel Castings in 1904 and 1905.—
Gross Tons.

	1905.		1904.	
	Basic.	Acid.	Basic.	Acid.
New England, New York and New Jersey.....	24,679	34,528	17,193	27,285
Pennsylvania.....	16,669	217,619	5,831	128,579
Ohio, Indiana, Illinois and other States.....	164,811	68,234	75,895	48,951
Totals.....	206,159	320,381	98,919	203,915

In 1905 Pennsylvania made 68 per cent. of the total production of acid open hearth castings, and the increase over 1904 was very largely in that State, the Chester District being the leading factor. In basic open hearth castings Illinois took the lead, contributing 43 per cent. of the total. The output of the group of foundries in the St. Louis District, on the east side of the river, is almost entirely basic steel and is principally heavy railroad work.

In Alabama, Michigan, Missouri and Colorado only basic castings were made. The long established steel foundries, which make machinery and miscellaneous castings, apparently are sticking to the acid process, while those built in more recent years adopt the process which gives them a larger range in the selection of material and fortifies them against times of severe competition, while giving uniform results with the lines of work in which they specialize.

The prosperity of the entire steel casting industry in 1905 is reflected in the statistics of production. The total of steel castings by all processes was 500,767 tons—22,103 tons of Bessemer, 526,540 tons of open hearth and 12,124 tons of crucible and all other castings. The increase last year was 70 per cent. over the record of 330,211 tons in 1904. Pennsylvania with 42 per cent., Illinois with 17.5 per cent. and Ohio with nearly 13 per cent., together made 72 per cent. of the steel castings of the country last year, the increase in basic steel from the larger foundries of Illinois and Ohio in the past few years being an important factor in their prominence.

Stability in the Pig Iron Market.

The comparative steadiness of the pig iron market since the beginning of the year and the continued absence of any considerable fluctuations in production or price are giving 1906 a place of its own. The query is suggested, whether the steadying influence so long exerted by the large steel companies on the situation in finished products has not been felt even in a market which is supposed to be beyond the natural sphere of such influence? While the foundry iron market is properly reckoned one of the freest it has been acting in a way that is probably not paralleled in the experience of men long in the business. With consumption so enormous, stock at furnaces limited to a few days' melt, and little of it readily salable iron at that, while for months the habit of the trade has been to make fairly close connection between the yards of the maker and the consumer, there has been no stir and no chance for prophets of a decided change in either direction to make any reputation.

Whenever it has been thought that the strong situation as to steel making pig iron was beginning to show a contrast with that in foundry pig the latter soon came to the point where its inherent strength was displayed. Even the recent flurry in Southern iron, which in some quarters was looked upon as the beginning of a downward movement, now seems to stand by itself as a closed incident. As has been indicated in connection with our monthly statistics of the production of coke and anthracite pig iron the effort to maintain output at a 25,000,000-ton yearly rate for iron made with mineral fuel has been repeatedly thwarted. Idleness for repairs and relining more than offsets the new capacity brought into action. The make of merchant furnaces has quite closely paralleled that of the steel works furnaces. The daily output in both classes has shown a steady though slight falling off since March, as appears from the following, calculated from the monthly returns to *The Iron Age* and stated in gross tons:

	Daily output, steel company furnaces.	Daily output, merchant furnaces.	Total.
March	45,174	24,685	69,859
April	44,453	24,654	69,107
May	44,272	23,429	67,701
June	43,114	22,577	65,691

* It need not be said that to be able to dispose of a certain amount of their product month by month has been a welcome experience to furnacemen in the past year. And where a season of holding off might have

been looked for in recent weeks, repeating the experience of one year ago, there has been no such deadlock. What hesitation existed was evidently for the making up of more definite conclusions about the crops, and that slight pause is now apparently at an end. At the same time there has been no wholesale buying and nothing like the disposition often seen to pre-empt capacity far ahead, with the result that buyers actually put the market up on themselves. With no surplus production, but rather the reverse, the buying is probably the most orderly and conservative on record. The spirit of the market is as far from that seen when a boom is on as it is from the languor and indifference that indicate the collapse of the boom. Consumers act as though they had orders that would use up all the iron and had no anxiety about a falling off in their own business or about any putting up of the price of iron.

Some things outside the iron trade might be discussed that present a less flattering aspect, but the present purpose is simply to emphasize the unusual moderation and soundness that have marked all departments of the industry in the wonderful twelvemonth it has just completed. It is worthy of note in connection with the question of pig iron supply and demand that at no time in the last half dozen years, not excepting 1904, have so few blast furnaces been nearing completion as at present. The great campaign of steel works furnace building under way in the Central West, since the beginning of 1902, practically ended early this year. Two or three merchant furnaces are under way. But otherwise no considerable additions to capacity are possible until far along in 1907.

Our Enormous Foreign Trade.

The foreign trade of the United States for the fiscal year ending June 30 far surpasses that of any previous year. According to the report of the Bureau of Statistics of the Department of Commerce and Labor, issued on Tuesday, the total value of imports and exports was \$2,970,378,991. Every year for the past four years has been a record breaker. The figures for the fiscal year 1905 were \$2,636,074,737, for the fiscal year 1904 they were \$2,451,914,642, for the fiscal year 1903 they were \$2,445,860,916. It will thus be seen that the fiscal year just ended has not won precedence by merely a slight increase, but by a very heavy gain.

While the increase was due to gains in both exports and imports, exports showed the larger increment. These amounted in the fiscal year 1906 to \$1,743,763,612, in the fiscal year 1905 to \$1,518,561,666, in the fiscal year 1904 to \$1,460,827,271, in the fiscal year 1903 to \$1,420,141,679. The imports in the fiscal year 1906 were valued at \$1,226,615,379, in the fiscal year 1905 at \$1,117,513,071, in the fiscal year 1904 at \$991,087,371, in the fiscal year 1903 at \$1,025,719,237. It was not until 1905 that our imports ever reached the value of \$100,000,000 in any one month, but in the fiscal year 1906 they averaged over that amount for the entire year. The largest imports for any one month were those of March, 1905, which amounted to \$110,431,188. The largest exports for any one month in the history of the country were those of December, 1905, which fell only \$300,000 short of \$200,000,000.

The figures for the fiscal year 1906 are further gratifying in the large excess shown of exports over imports. This excess reached the very large amount of \$517,148,223, against an excess of \$401,048,595 in the previous year. Large as it was, however, it has been exceeded in four past years—namely, in 1898, 1899, 1900 and 1901.

In those years, however, our exports were growing rapidly, while our imports were almost stationary. In this connection it is worthy of note that since 1878, a period of 28 years, only three years have shown an excess of imports—namely, 1888, 1889 and 1893.

The exports for the fiscal year 1906 are classified as consisting of \$890,578,504 agricultural products and \$853,185,108 nonagricultural products. In 1905 nonagricultural products showed a preponderance of about \$16,000,000, but that was a highly exceptional occurrence, as our exports in all previous years consisted most largely of agricultural products. The fact that agricultural exports took second place last year and only maintained a slight lead this year indicates the rapidity with which exports of manufactures are gaining. The United States may for a long time continue to supply large quantities of food to the rest of the world, but its evident destiny is to furnish even greater values in the products of its mines and factories.

It would be pleasant in connection with this magnificent showing made by our foreign trade to be able to say that a considerable portion of it was transported in American vessels. This is the seriously weak point in our foreign commerce. It is humiliating to acknowledge that this great traffic, larger than the foreign trade of any other country, is almost absolutely dependent upon the transportation facilities provided by our trade rivals. They are equitably entitled to a portion of the traffic, but they should by no means be permitted to enjoy practically the whole of it.

The National Employers' Liability Act.

Congress has passed an employers' liability act applying to common carriers which is so radical in its provisions, so favorable to the interests of the employee and correspondingly unfavorable to the interests of the employer, that it contains food for serious reflection. Laws are in a sense contagious. If the national Government or a State establishes a new order of things by statute the effort is sure to be made in other States to secure the passage of a similar enactment. Usually the effort, if at first a failure, is repeated year after year, sometimes with success, and if the new national employers' liability act is copied by the States it may prove a serious matter. From the standpoint of the employer the act is pernicious, not only in its general definition of what shall constitute liability for damages, but also because the whole question is left unreservedly to the jury. When a jury is untrammelled by fixed restrictions the sympathy for the employee usually, at any rate very often, outweighs the dictates of justice.

The national act provides, "That in all actions hereafter brought against any common carriers to recover damages for personal injuries to an employee, or where such injuries have resulted in his death, the fact that the employee may have been guilty of contributory negligence shall not bar a recovery where his contributory negligence was slight and that of the employer was gross in comparison, but the damages shall be diminished by the jury in proportion to the amount of negligence attributable to such employee. All questions of negligence and contributory negligence shall be for the jury." The act contains no provision for limit of damages which may be recovered for death or injury such as is generally provided under existing laws, and the usual provision making the employer liable where the negligence is that of a fellow servant is retained. The combined result is something unheard of in existing employers' liability acts. The old common law was not sufficiently favorable

to the employee because it did not make the employer liable for the negligence of a fellow servant. Consequently special acts were passed providing a more equitable condition of things, but the limit of damages was fixed. The national act continues everything that is favorable to the employee and adds to it provisions so unusual as to be almost revolutionary. The railroads will attack the constitutionality of the law on the ground that such an act is not a regulation of interstate commerce. If they win their cause it will relieve them of a burden which promises otherwise to be a very serious and expensive one. But if a State should make such a law it might be more difficult for its opponents to upset it.

One can readily imagine the consequence of leaving to a jury the determining of the relative amount of negligence as between the employer or his servant on the one hand and the injured workman on the other. Perhaps, presuming the law to be established in some State, a dangerous condition exists in some machine and the foreman warns the workman against it. The workman is negligent because he did not heed the warning and is injured. The employer is negligent because of the existence of a dangerous condition which might have been guarded against. Would the jury decide the relative degrees of negligence with full regard to the equity of the case? Most employers who have had experience in tort cases under existing employers' liability acts will answer in the negative. It seems to be human nature for the average jury to lean toward the financially poorer of the parties at action. Where there is no limit of damages this tendency is the more certain.

Iron Ore Valuations in Accounting.

A trust deed recently given by a blast furnace company to secure an issue of bonds required the payment to the trustee of \$1 a ton for every ton of iron ore in excess of a stipulated amount taken from the company's lands in a given year. In this particular case the purpose is evidently to conserve the ore resources of the company in the interest of the bondholders, limiting the amount taken out annually to the actual requirements of the furnace company in the particular ores it owned and which formed but a part of its mixture. The sale of these ores in the market, for example, would require a payment to the trustee of an amount compensating for the loss in capitalized values. The amount named is the \$1 a ton which in more recent years has been discussed as the value of Lake Superior ore in the ground, and exceeds only slightly the actual price named as the basis of the much talked of transfer of Hill ores to the United States Steel Corporation. The disposition to accept this high valuation as one which, if not yet established, will be reached in the not remote future with the rapid exhaustion of lake ores suggests a question: Where is the mining company, or the blast furnace or steel works company having its own ore supply, that charges off \$1 a ton, or even half that amount, for ore taken out year by year from fee owned or any other property? If ore reserves represent as great a part of the capitalization of important companies as has been currently claimed, there should be a more heroic way of taking account of the yearly decrement.

The Central Inspection Bureau is the name of a new company formed in Middletown, Pa., with H. A. Clark and T. C. Ashenfelter, New York, and John E. Cobaugh, Middletown, as incorporators. The company will furnish inspectors for material, workmanship, construction, &c.

CORRESPONDENCE.

Remedy Wanted for Oil Engine Exhaust.

To the Editor: It occurs to the writer that some of your many readers may be in a position to advise him how to remedy the disagreeable odor emanating from the exhaust of an oil engine. The situation is this: The engine has a capacity of about 10 hp. and is used for pumping water from a river to an elevated tank for domestic supply. The engine is located on the bank of the river just below several fine residences, toward which the prevailing wind tends to waft the exhaust gases and it would only aggravate the nuisance if the exhaust pipe were carried to a greater height. That expedient is therefore out of the question, as is also the one of passing the exhaust into the river, as the pollution of the water would not be allowed. The engine is without means of regulating the proportion of oil to air, so that a change of mixture for more perfect combustion (if possible) is not feasible. Some attempt has been made to destroy the odor by passing the exhaust over a coke fire, but with poor success. If any one has experienced a similar difficulty to the one outlined above and can suggest a means for overcoming the annoyance it would probably be of interest to many others, and would certainly be greatly appreciated by the writer.

C. R. H.

MARIETTA, Ohio, July 12, 1906.

Cast Iron Pipe History.

To the Editor: In a recent issue of your journal a reference was made to the early manufacture of cast iron pipes, which I think should be corrected as making false history.

According to the early reports of the Philadelphia Water Works, for reference to which I am indebted to John C. Trautwine, Jr., former chief engineer of the Water Bureau of Philadelphia, the first experiment with cast iron pipe was made in 1801, at the Centre Square, (now Broad and Market streets), by laying 14 lengths of 6-in. cast iron pipe, each 6 ft. long, which were procured from Robeson & Paul, merchants of this city, who were running the Weymouth Furnace at Atsion, N. J. In 1804 the same parties furnished 56 tons of 3-in. pipes, which were laid in Water street, in 1817.

The subject of substituting iron pipes for the wooden ones in use was a burning question, and a lot of pipes, ordered from England, arrived in 1818. Samuel Richards appears to have furnished a large amount in 1819 and 1820, which in all probability were made at one of the New Jersey furnaces. These were as large as 20 and 22 in. in diameter. In 1821 Benjamin B. Howell of Hanover Furnace, on the head waters of the Rancocas Creek, furnished pipes and castings to a considerable amount, and the ownership of this furnace having passed to his son-in-law, Benjamin Jones, the manufacture of cast iron pipe was continued until the late 50's, when the furnace was abandoned owing to exhaustion of ores.

The Pascal Iron Works was not established until 1835, although wrought iron pipes were first made by Morris, Tasker & Morris, at the southeast corner of Third and Walnut streets, prior to that date. The development of the business then demanded the establishment of the Pascal Iron Works at that time. Within the memory of the writer, cast iron pipes were made there in considerable quantities from 1849 to 1869.

HENRY G. MORRIS.

PHILADELPHIA, July 11, 1906.

A late leaflet of Rogers, Brown & Co., Cincinnati, Ohio, has the title "The Fable of the Foundryman Who Was Willing to Be Put Next." The story hinges on the turn that came in the affairs of a foundryman with a large scrap heap who allowed a salesman representing 50 different brands of iron and 30 different cokes to make a new mixture for him.

Armstrong, Whitworth & Co., Ltd., Newcastle-on-Tyne, England, have contracted to build for Brazil three sister battleships, each to cost over \$5,000,000.

The New Customs Administration Bill. Changes Which Carry Out the Agreement with Germany.

WASHINGTON, July 16, 1906.—The House of Representatives in the closing hours of the recent session passed a measure amending the customs administrative laws in several important particulars. The bill was debated at considerable length, but was strongly championed by members of the Ways and Means Committee, who successfully resisted all attempts at radical amendment.

The measure as passed provides for the amendment of sections 5, 7, 12, 13, 14 and 15 of the customs administrative act of June 10, 1890, and it is believed embodies the best suggestions of the Merchants' Association of New York, the New York Board of Trade and Transportation and leading customs lawyers of the metropolis. The measure is entirely satisfactory to the Treasury Department, especially as it aids in carrying into effect the agreement made with the German Government under which the products of the United States will continue to enjoy Germany's minimum tariff.

In section 5 the present law is amended so as to enable the owner of purchased goods to make a declaration stating that he has become possessed of goods "by purchase" rather than by manufacture. The change is regarded as important because of other modifications made by the bill with reference to the treatment of consigned and purchased goods.

Section 7 permits the owner, consignee or agent of any imported merchandise which has been actually purchased at the time when he makes entry thereof, but not afterward, to make a deduction from as well as an addition to the invoiced valuation so as to lower or raise the same to the actual market value or wholesale price of the merchandise at the time of exportation to the United States in the principal markets of the country from which the same has been imported. It is specifically provided that neither deduction from nor addition to the invoiced value shall be made upon entry of any imported merchandise obtained otherwise than by actual purchase.

A second amendment to this section provides that where the appraised value exceeds the value declared in the entry additional duties shall not attach unless the difference is more than 5 per cent. Under the present law there is no margin, and there has been much complaint that honest importers have been mulcted in heavy penalties, which could not be avoided, no matter what precautions might be taken. In this connection the bill also provides that no penal duties shall be assessed where the amount of duty imposed by law upon the appraised value does not exceed the amount of duty that would be imposed by law upon the entered value, a provision designed to prevent the imposition of penal duties in cases where the classification is charged by the appraising officers without any resulting increase in the duties payable on the importation.

The Forfeiture Limit Raised.

One of the most important changes in section 7 provides that "there shall be no forfeiture of an importation unless the appraised value exceeds the entered value by more than 100 per cent." Under the present law undervaluations of 50 per cent. and over are presumptively fraudulent and the goods are required to be seized and forfeiture proceedings begun. To sustain such proceedings, however, it is necessary to show fraud on the part of the importer, and as great difficulty is always encountered in proving the intent in such cases the Government almost invariably meets with defeat. Because of this condition appraising officers usually content themselves with advances not exceeding 48 or 49 per cent., and thus the Government loses a large amount of revenue in the form of penal duties.

Under the proposed law if an undervaluation exceeded 50 per cent. the collector would take additional duties up to 100 per cent., and thus in the great majority of cases of excessive undervaluation the Government would secure large additional revenue and the importer would be heavily penalized without the necessity of protracted and costly litigation.

An attempt is made in the amendments to section 12 of the existing law to additionally safeguard the tenure of the Board of General Appraisers by providing that the President shall remove an appraiser only for one of the causes mentioned in the existing law or because of "mental or physical incapacity." Under the present law the courts have held that while the appraisers may be removed for any of the causes mentioned in the act the President has authority under the general statutes to remove them without cause.

Section 13 of the administrative act is amended by the Payne bill so as to limit to 30 days the period within which a collector, when he deems the appraisement of an importation too low, may order a reappraisal. Under the existing law there is no limit of time, and thus there is much uncertainty as to the probable action of the collector and frequently much delay in the final liquidation of entries.

Rehearings by the Board.

Rehearings by the Board of General Appraisers are authorized by an amendment to section 14 in the form of the following proviso:

Provided, however, that the board of three General Appraisers, or a majority of them, who decided the case, may, upon motion of either party, within 30 days from the date of the receipt of their decision by the Collector, grant a rehearing of said case when in their opinion the ends of justice may require it. The general board of nine General Appraisers shall have power to establish from time to time such reasonable rules of practice not inconsistent with law as may be deemed necessary for the conduct of its proceedings and of the proceedings of the said boards of three General Appraisers.

Section 15 is amended in a very important respect. It provides that reviews of the proceedings of the General Appraisers shall be made by the Circuit Court of Appeals instead of by the Circuit Court as at present, and further requires that all the evidence shall be produced before the Board of General Appraisers prior to its decision of the case. To safeguard all interests it permits the Circuit Court of Appeals, on a hearing before it, to order the Board of General Appraisers to take additional testimony to form a part of the record before the court. The amendments to this section also give a right of appeal to the United States Supreme Court in all cases.

The bill was passed by the House at too late a date to receive any consideration at the hands of the Senate Finance Committee. That committee, however, has been authorized to sit during the recess, and it is believed it will gather data before Congress reconvenes that will insure the passage of the bill, possibly in a revised form, early next winter. The original customs administrative act is now 16 years old and has never been comprehensively revised. The McKinley, Wilson and Dingley tariff laws have all been passed since it went into force, and the necessity for bringing it up to date is now fully recognized by the leaders of both houses.

W. L. C.

Power from Waste Gases in Great Britain.—In his address at the fiftieth anniversary meeting of the German Society of Engineers, as given in synopsis in *The Iron Age* of June 28, 1906, page 2063, Dr. H. Hoffman of Bochum estimated that 500,000 hp. could be obtained by the proper utilization of coke oven gases now wasted and 1,000,000 hp. from blast furnace gases, if used to drive gas engines. H. E. Wimperis, by a similar calculation in an article in the *London Times Engineering Supplement*, figures that in Great Britain coke oven and blast furnace gases now wasted could be made to develop 1,000,000 hp.—300,000 hp. from the former and 700,000 hp. from the latter. He says: "So far little has been done in this country, but with the keen interest now taken in every development connected with the internal combustion engine it is not likely that the metallurgical industries here will remain blind to anything which affects so strongly their own interests. Probably the results obtained at the Shelton Iron & Steel Company's Works, where it is understood that a plant of about 700 hp. has recently been put down to deal with coke oven gases, will, when the details are published, operate largely to bring others in this country to a decision for or against the speedy introduction of such engines in their own works."

An Erratic Pig Tin Market.

An advance of 11 cents per pound and a decline of 13 cents within a space of ten weeks is the record of an unusually irregular range of prices in a metal which is noted for its widely varying fluctuations and quick changes. The highest price quoted for 5 ton lots was on May 16, when this metal was quoted at 49 cents, New York. Sales were made on that day of regular sized lots in London at £215, equivalent to 46.80 cents, c.i.f. New York. In the three weeks preceding the highest point the metal had been quietly advancing, as on April 25, it was sold slightly under 40 cents, while on May 2, the price of 40 cents was recorded. A week later sales were made at 43½ cents.

The market in this country during the entire period of excited prices was held at a high premium over London, because of the meager stocks held here and the scanty arrivals. At times it was almost impossible to obtain any metal, and for a period of a week or ten days considerable difficulty would have been experienced in finding a 25 ton lot in fact, to secure so large an amount it would probably have been necessary to have gone to a number of dealers, and perhaps even to some of the retail holders.

The cause of the great advance was popularly ascribed to a corner, but this was a corner of a peculiar nature, as it was wholly brought about by consumers who bought largely of spot and future metal, thinking that still higher prices would be recorded and that it would be years, if ever, until tin would sell below 40 cents. The market finally collapsed of its own weight, and a week after the high price was recorded a decline of over 7 cents had been made. At the beginning of June the position was not unfavorable to buyers of the metal and prices began to fall from day to day. Whenever there were sales of good volume here, the London market would sag off the next day, showing that there was a tendency on the part of large operators to liquidate their holdings.

The sharp decline during the past fortnight was brought about primarily through the unfavorable statistics, which were issued on July 2. While these showed that deliveries into consumption were large they also showed that the visible supply throughout the world was slightly greater than at the same time a year previously, when prices were from 6 to 8 cents per pound lower. It was plainly shown that the reduction in the visible supply, which always takes place between the last of January and the last of June, had been the least during the year 1906, of any year during the past five. These figures as well as the visible supply on June 30, of the last five years, are given in the following table in gross tons:

Reduction of Visible Supply from January 31 to June 30.

1906.	1905.	1904.	1903.	1902.
2,330	3,707	3,335	2,572	2,454

Visible Supply on June 30, Each Year.

11,956	11,938	13,780	15,107	15,897
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The full purport of this information did not become evident until several days had passed, consumers evidently being slow in realizing the fact that consumption throughout the world had fallen off greatly during this period of high prices. On July 11, however, a sharp reduction was made in the London price and the metal dropped to 36 cents in New York. This London price followed some liquidation by large holders of the metal who had been among the prominent operators during the advance. This appeared as a mark of distrust, and other operators feared liquidation would then be likely to run its full course. On the contrary, however, strong interests appeared in the market supporting it at around these figures and have continued to do. The high price at which the metal sold was realized by but few holders throughout the world. One operator, however, had good supplies of the metal, which were sent to New York only as this market would absorb them. Others were slightly belated, but it has been variously estimated that 1000 tons or over were sold at prices varying from 44 to 50

cents, which must have shown a loss to the holders in the neighborhood of \$200 a ton.

The outlook for high prices for the next two months is not at all encouraging, as the country is now entering upon the smaller consumptive period of the year when the tin plate plants are curtailing their production. There is, too, another factor which may have some effect, that being the prejudice of the public against the use of canned or tinned meats, it being well known that the packers consumed goodly quantities of tin plate and solder. Further, during the months of April and May and the early part of June when pig tin was at its highest there was a disastrous period of price cutting by the manufacturers of pieced tinware, and consumers bought heavily at this time in anticipation of needs later in the season. This means that some of the tin which would ordinarily go into consumption during the latter part of the year has already been used and is now in the retailers' hands in the shape of manufactured articles.

Amalgamated Scale Signers.

We give below a list of the associations and firms that have signed the Amalgamated Association wage scales for the year commencing July 1:

Western Bar Iron Association.
 Republic Iron & Steel Company.
 American Sheet & Tin Plate Company.
 Western Iron Mills Company, Denver, Colo.
 Zug & Co., Pittsburgh, Pa.
 A. M. Byers & Co., Pittsburgh, Pa.
 Lockhart Iron & Steel Company, McKees Rocks, Pa.
 Brown & Co., Incorporated (Wayne Iron Works), Pittsburgh, Pa.
 A. M. Byers & Co., lessee Clearfield Steel & Iron Company, Clearfield, Pa.
 Howe-Brown works of the Crucible Steel Company of America.
 Ewald Iron Company, Louisville, Ky.
 Newport Rolling Mill Company, Newport, Ky.
 Western Steel Car & Foundry Company, Anniston, Ala.
 Empire Iron & Steel Company, Niles, Ohio.
 Westerman & Co., Lockport, N. Y.
 American Rolling Mill Company, Middletown, Ohio.
 Sheffield Rolling Mill Company, Sheffield, Ala.
 Waynesburg Forge, Sheet & Tin Mill, Waynesburg, Pa.
 National Enameling & Stamping Company, Granite City, Ill.
 Wheeling Steel & Iron Company, Wheeling, W. Va.
 Railway Steel Spring Company, Detroit, Mich.
 Pope Tin Plate Company, Steubenville, Ohio.
 Carnahan Tin Plate Company, Canton, Ohio.
 Sligo Iron & Steel Company, Connellsville, Pa.
 Youngstown Sheet & Tube Company, Youngstown, Ohio.
 Cleveland Hardware Company, Cleveland, Ohio.
 Youngstown Iron & Steel Roofing Company, Youngstown, Ohio.
 Licking Rolling Mill Company, Covington, Ky.
 Whitaker Iron Company, Wheeling, W. Va.
 Niles Iron & Steel Company, Niles, Ohio.
 Kansas City Bolt & Nut Company, Kansas City, Mo.

The Electric Cable Company, New York, is placing on the market a new waterproof paint, which can be made in any color, and will not flake off or crystallize. It has already been successfully used to prevent electrolysis and corrosion on structural steel, rail bonds, concrete work, &c. The paint also prevents the absorption of water by wooden reels on which wire and cable are wound for shipment. It is stated that these reels, when not painted, sometimes take up 8 to 10 pounds of water when exposed to the rain. This has often caused considerable annoyance to the purchaser who weighs the reels upon delivery. The United States Government has placed a large order with the Electric Cable Company for the paint, to be used on the bottoms of vessels, as has also the Marine Department of the New York Central Railroad, the paint to be applied to the bottoms of its tug boats to prevent fouling and corrosive action.

The June issue of *The Valve World*, published by the Crane Company, Chicago, contains an interesting article on the "History of the Fittings Business," by R. T. Crane. The firm of R. T. Crane & Brother was started in 1856, from which the present Crane Company is an outgrowth. An interesting feature in connection with the article is an illustration of a one-spindle tapping machine for tapping fittings up to 2 in. which has been in continuous service for over 50 years.

PERSONAL.

August Mann, for six years general superintendent of the Rankin plant of the American Steel & Wire Company, Rankin, Pa., has taken charge of the company's Donora plant in the same capacity. He has been succeeded at Rankin by James DeButz of Chicago.

For two or three years Arnold K. Reese, a native of Baltimore, who previously had done good work as an engineer at the plant of the Maryland Steel Company at Sparrows Point, and also at plants in Pennsylvania, has been superintending the remodelling on American lines of the furnaces of the Dowlais Works at Cardiff, South Wales, of Guest, Keen & Nettlefolds, Ltd., one of the largest and oldest iron and steel plants in Europe. It is gratifying to learn that Mr. Reese has now been selected to take complete charge of the works, as general manager.

H. Van Atta has retired from the superintendency of the J. L. Mott Iron Works, and his temporary business address is now in care of the Ajax Decorating Company, 138th street and Third avenue, New York City. His services are open as consulting mechanical engineer.

Elbert H. Gary, chairman of the United States Steel Corporation, sailed for Europe on Tuesday for a two months' vacation, most of which will be spent in auto-mobiling in the south of Europe.

Col. Millard Hunsicker has resigned the management of the European agency of the United States Steel Corporation.

Charles A. Moore, Jr., secretary of Manning, Maxwell & Moore, New York; Homer Davenport, the cartoonist, and J. H. Thompson, Jr., left New York July 5 on the French steamship *La Lorraine* for Arabia, to purchase 16 Arabian thoroughbreds for breeding purposes. With quite a retinue they will go 600 miles into the interior. Special permission was received from the Sultan of Turkey to bring the horses out.

The names of E. G. Spillsbury, New York; Persifor Spillsbury, Cananea, Mexico, and A. E. Carlton, Cripple Creek, Colo., were added last week to the list of members of the American Institute of Mining Engineers who sailed on the Celtic, July 13, for the joint London meeting and the provincial tour of the Iron and Steel Institute.

F. N. Hoffstot, president of the Pressed Steel Car Company, sails for Europe July 19, on the Kaiserin Augusta Victoria. Mr. Hoffstot intends to spend some time touring Europe in an automobile.

Robert Job, the well-known chemist of the Philadelphia & Reading Railroad, at Reading, Pa., has resigned and has joined the firm of Booth, Garrett & Blair, Philadelphia.

James Gayley, first vice-president of the United States Steel Corporation, sailed for England on Tuesday, July 17. One or two contracts have been made for the installation of the Gayley dry blast at British furnaces and others are pending.

E. S. Cook, president of the Warwick Iron & Steel Company, Pottstown, Pa., has sailed for Europe.

P. McManus has accepted the position of superintendent of the Detroit Steel Casting Company, Detroit, Mich., taking charge July 1.

OBITUARY.

ELBRIDGE N. HARRIS, president of the Rodney Hunt Machine Company, Orange, Mass., died at Malden, Mass., July 12, aged 77 years. He was a native of Ashburnham, Mass. For more than half a century he had been engaged in the manufacture of turbine water wheels and woolen machinery.

JOHN W. ROBINSON, the founder of what is now the Virginia Iron, Coal & Coke Company, died at his home at Graham Forge, Va., July 16, aged 67. He was prominently identified with the company up to the time of his death.

Labor Notes.

The temporary injunction secured by the Allis-Chalmers Company in the United States Court at Milwaukee against the striking iron molders was dissolved on July 13 by Judge J. V. Quarles, who issued the original order. The bill of complaint charged an unlawful combination of the employees of the Allis-Chalmers Company for the purpose of crippling and destroying the business of the company by preventing the operation of its plant. The answer filed by the defendants denied that unlawful means had been resorted to in the prosecution of the strike. Judge Quarles decided that unlawful means had not been adopted. The attorney of the molders was directed, however, to incorporate in the order a provision that the Allis-Chalmers Company would have the right to renew its application for an injunction. Judge Quarles also warned the strikers, many of whom were in court, that if he found such a writ ever became necessary the arm of the law would fall heavily. The decision is regarded by the strikers as giving them permission to continue the practice of picketing.

The murder of a special policeman and the inflicting of serious injuries on two other watchmen are the latest developments of outlawry of which members of the Housesmiths' and Bridgemen's Union in New York have been guilty. On July 11, 30 ironworkers, members of the above union, attacked three men who had been employed to protect the lives of nonunion iron stairway workers of the George A. Fuller Construction Company on the new Plaza Hotel. The attacking unionists were at work on the same building. By dropping hot rivets, bars of steel and heavy tools from upper floors of the building the union men were putting the lives of the nonunion men in constant jeopardy. The bringing in of the special officers was resented by these precious law breakers and threats were freely made. At the end of the noon hour on Wednesday the union workers cut the ropes supporting the ladders leading to the floor where the watchmen were stationed and then attacked all three. One was thrown through the floor beams, falling to the fifth floor, 50 ft. below. He died in the hospital a short time after. The attempt was made to throw one of the other watchmen from the building, but a foreman intervened. Both men were seriously injured, each having been attacked by a dozen men. Four arrests were made.

Heating and Ventilating the New Custom House.

One of the most complete heating and ventilating systems in the country is that installed in the new United States Custom House now under construction in New York City. This is a large 7-story building occupying a lot 300 ft. long by an average of 240 ft. in width. With the exception of a small part an indirect heating system is used throughout. The corridors are heated by the special secondary utilization of the air after it has passed through the offices and rooms of the building, and will thus serve, with the elevator shafts, as vent outlets for all rooms heated.

On account of the size of the building the heating and ventilating system was for convenience divided into four independent divisions, each serving a section of the building adjacent to one corner. Each division has an independent blower and duct system, together with air washing apparatus, tempering and heating coils and duct work. The blowers, of which there are four, furnished by the B. F. Sturtevant Company, Boston, Mass., are three-quarter housing, peripheral discharge, steel plate fans with 12 ft. wheels, 6 ft. wide. Each fan has a capacity of 100,000 cu. ft. of air per minute at 140 revolutions. The fans are belt driven by electric motors and deliver into ducts or cases measuring 6 x 7 ft. in cross section. The heating coils are controlled by thermostats. Very novel and interesting features are introduced in the way of spray chambers, tempering coils and reheaters, dry chambers and arrangements for avoiding back drafts to the rooms, &c.

NEWS OF THE WORKS.

Iron and Steel.

The Valley, Brown-Bonnell and Bessemer steel plants of the Republic Iron & Steel Company at Youngstown, Ohio, which closed down on July 1 for inventory and repairs, will be started this week. Blast furnace No. 2 at Haselton is nearly completed and is expected to be ready for operation about September 1. No. 3 stack, which is under erection, will not be ready for blast before November or December this year.

Claire Furnace of the Claire Furnace Company at Sharpsville, Pa., has gone out of blast. The stack will be relined and other improvements made, and it is expected the furnace will resume blast the latter part of August.

The Struthers works of the American Sheet & Tin Plate Company, at Struthers, Ohio, which has been idle for some months, is being repaired and new equipment installed. It is expected this plant will resume operations within a short time.

No. 1 furnace of the Carnegie Steel Company at South Sharon, Pa., has gone out of blast for relining and other repairs.

The Hamilton Iron & Steel Company, Hamilton, Ont., is planning to erect an additional blast furnace.

The Amsler Engineering Company, engineer and contractor, Diamond Bank Building, Pittsburgh, will build a 25-ton open hearth steel furnace for Mackintosh, Hemphill & Co., Pittsburgh.

The Woodward Iron Company, Woodward, Ala., has begun dismantling its No. 2 furnace, and as soon as the material is cleared away the construction of a duplicate of No. 3 furnace will be started.

The furnace to be erected at Erie, Pa., by E. H. Williams and others of Sharon, Pa., and Erie, will be operated by the Perry Iron Company, which was incorporated the past week with a capital stock of \$400,000, and which has opened offices in the Penn Building, Erie. Although the final organization of the company and definite plans for the machinery for the stack have not yet been made, it is the intention to start construction work immediately upon a blast furnace to have a daily capacity of 300 tons.

The John A. Roebling's Sons Company has just closed a contract for structural steel to be used in the construction of its new rod mill at Kinkora.

The Richmond Furnace at Cheshire, Mass., which was built in 1863 and which has been idle for the past 13 years, has been purchased by Samuel G. Colt of Pittsfield, Mass., who will make the necessary repairs and place the furnace in operation, making charcoal iron to be used exclusively for the manufacture of car wheels and engine cylinders. When in full operation from 50 to 75 men will be employed at the works. Included in the purchase is an ore bed west of the village which is estimated to contain an abundant supply, together with three other beds adjoining.

Notice of increase of capital to \$500,000 has been filed at the State Capitol of Pennsylvania by the Federal Steel Company, Chester, Pa., which recently started its plant.

General Machinery.

Among other large orders recently received by the Wellman-Seaver-Morgan Company is one from the Cia de Beal del Monte y Pachuca for electric hoists for mines in Mexico, the order comprising six hoists with double reels 12 ft. 8 in. maximum diameter, each hoist to handle a load of 18,800 pounds at 1000 ft. per minute; six hoists with double reels 10 ft. 6 in. in diameter, each hoist to handle a load of 11,300 pounds at 500 ft. per minute, and one double drum electric hoist with drums 36 x 48 in., to handle a load of 8600 pounds at 500 ft. per minute. This is probably the largest order for electric hoists ever placed in this country.

The Stratton & Bragg Company, Petersburg, Pa., jobber of machinery and general contractor, owing to the great increase of its business demanding a large amount of changing and fitting of machinery, has commenced the erection of a machine shop at the rear of its premises, 31 and 33 North Sycamore street. It has installed a number of machines, including lathes, planers, drill presses and pipe threading machines. Until now all its work has been done outside.

A. N. Frecker, 95 Liberty street, New York, has incorporated to manufacture portable bench grinders, with a capital of \$1000. The company will have its product manufactured by an outside firm for the present.

The Cady Machine Company, Cleveland, has been reorganized with the same name under the laws of Ohio, with a capital stock of \$10,000. The company will continue the manufacture of power presses, bar iron cutters, punches, drop hammers and wire forming machinery at the old location, 1227 Euclid avenue. The company reports the sale of a number of power presses in Seattle, Wash., and it is now about to ship a 100,000-pound press to that place.

The McMyler Mfg. Company, Cleveland and Warren, Ohio, reports a greater volume of business on car dumping and conveying machinery than ever before in its history. It is at work on seven very large outfits ranging in value from \$50,000 to \$75,000 each. It is building two car dumpers for the Wheeling

& Lake Erie Railway at Cleveland and Huron, an outfit for the Pittsburgh Coal Company at Fairport, Ohio; an outfit for the Staten Island Rapid Transit Company, Staten Island, N. Y., and has commenced shipping material for a large electrically operated car dumper and conveyors for the British Government at Natal, South Africa.

The Hayes Machine Company, Brooklyn, N. Y., intends to move its plant to Kingston, N. Y., where new buildings will be erected to accommodate the present equipment. The company is well equipped with machine tools, and it does not expect that it will require anything to speak of in that line for the present; but it would consider the purchase of a second-hand steam plant of from 40 to 50 hp., in good order, that could be bought cheaply. Some shafting, hangers and pulleys will about complete the requirements of the company, which makes box nailing machines, printers and veneer slicing machines.

The Oil City Iron Works, Jennings, La., has bought out and absorbed the Dobbins Iron Works of that place. This latter shop is well equipped. The two will be operated in conjunction. The consideration is not definitely known, but it is said to have been \$30,000.

The Winnfield Iron Works, Winnfield, La., is now completed and is one of the largest plants of the kind in Louisiana. The plant is owned and operated by a stock company composed of the Louisiana & Arkansas Railway Company and a number of larger saw mill concerns of that section. The plant is equipped with all the machinery necessary to handle the rolling stock of a railroad, as well as the machinery used in the larger saw mills. In addition to a large machine shop, a complete foundry is operated where all kinds of castings are made. The plant has been under construction for five months.

The American Clay Working Company, Bucyrus, Ohio, is erecting a new machine shop and a new foundry building. These improvements will be completed in about 90 days and will greatly increase the facilities of the plant. Work has also been started on an additional shop which will be used as a clay testing department and in which will be installed special machinery for testing samples of clay and bricks. The new department will be complete in itself, independent of the main factory, and will be operated by a 50-hp. gas engine.

The George A. Hogg Iron & Steel Foundry Company, Pittsburgh, Pa., has booked sufficient work during the last two weeks to compel it to run its entire plant overtime. Recent orders include three roll lathes, two large shears, two furnace chargers, besides several orders from the Carnegie Steel Company, Pittsburgh, for rolling mill and blast furnace equipment; Cleveland Steel Company, Cleveland, Ohio, four large chilled rolls. The company has recently shipped a pair of 31 x 88 in. chilled rolls to the plate mill of the Lackawanna Iron & Steel Company, Buffalo, N. Y. The introduction of modern methods in the production of roll castings enables the company to increase its output and to produce a chilled roll of superior quality. The company claims that its new roll has a better face and less sensitiveness to heat, thereby reducing the breakage to a minimum. The superintendent, W. H. Melaney, has had many years' experience as a roll turner in rolling millwork, and is well qualified to produce rolls best suited to the various requirements.

The Buckeye Traction Ditcher Company, Cleveland, Ohio, will shortly complete a large addition to its plant, which has been badly needed, as the company has been compelled to turn down orders for its automatic ditch digging machine. Last week it shipped to a Chicago contractor a traction ditch digging outfit capable of cutting a trench 2 ft. wide and 10 ft. deep through hard clay soil.

The Lima Locomotive & Machine Works, Lima, Ohio, is making some important improvements to its plant, including a large addition to the erecting shop and a seven-story office building. The present two-story office building will be fitted up as an addition to the machine shops. Some heavy tools have recently been installed, including a large lathe for turning locomotive drivers, frame slotter having a 32-ft. bed, flue flanging machine and some heavy riveters. The company is shipping three Shay type locomotives to the Chesapeake & Ohio Railroad which are said to be the largest and heaviest locomotives ever built, the total weight of engine and tender being 330,620 pounds.

The Alliance Machine Company, Alliance, Ohio, has broken ground for a large addition to its plant. The structure will be of brick and steel, 100 x 120 ft. A battery of new boilers will be installed in the power plant and considerable new machinery will be added.

The Ohio Central Railroad has let a contract for the erection of a new boiler shop as an addition to its shops at Bucyrus, Ohio.

The Pittsburgh Pneumatic Company will shortly commence the manufacture of hand riveters, yoke riveters, chipping hammers, drills and other pneumatic tools at Canton, Ohio. The company is capitalized at \$250,000. Frank M. Faber is president and general manager; Charles H. Johnson, treasurer and superintendent; Charles C. Murray, secretary. The company has acquired the old wringer works on the Wheeling & Lake Erie tracks, which it is now fitting up for its requirements. Charles Johnson, the superintendent, is the designer and inventor of the tools which will be the company's principal output.

Foundries.

The Reliable Foundry & Machine Company, Fort Madison, Iowa, has been incorporated with a capital stock of \$40,000, of which \$30,000 has been paid in. A general foundry and machine business is to be conducted. Aldo Sommer is president; E. P. Schanz, vice-president and treasurer; P. Schanz, secretary, and H. A. Schanz, manager.

The Lynchburg Foundry Company, Lynchburg, Va., expects to commence operating the Radford pipe works, which it purchased some months ago, about August 1. It has had and continues to have orders much beyond the capacity of its old works. The company has recently received contracts for pipe for the whole water system at Leesburg, Va.; Lawrenceburg, N. C., and the water pipe required in connection with the Jamestown Exposition, the latter amounting to \$60,000. At the Radford works the company in addition to making pipe will manufacture heavy locomotive castings for the trade generally.

The Wytheville Foundry & Machine Shops, Wytheville, Va., have been placed in operation under the management of H. C. Clayton, who has had several years' experience in machine shops and foundries in Connecticut, having first learned his business with the Pope Mfg. Company, Hartford. The making of small castings will be a specialty.

The Canton Pump Company, Canton, Ohio, is shipping two duplex elevator pumps for installation in the new 17-story Wells Building at Milwaukee. They are said to be the largest pumps of the kind ever built.

The Mahoning Foundry & Machine Shops, Danville, Pa., which were lately conducted by Daniel M. Curry under the firm name of Curry & Co., have been sold to F. H. Vannan, T. J. Price, C. E. Haupt, I. Vannan, C. L. Foulk and R. B. Pursel, who will continue the business under the name of the Danville Foundry & Machine Company.

The Alliance Foundry Company, recently formed at Alliance, Ohio, has commenced work on a foundry 75 x 100 ft., and it will erect other buildings later. The company will do general foundry work, making a specialty of the Schryer heating furnace, now being manufactured in Columbus.

Adolph W. Neudeck, Kansas City, Kan., and Hartzell Fisker, Kansas City, Mo., have applied to the City Council for a 99-year lease on 5 acres of land on the levee along the Missouri River. The company, if it secures the lease, will erect a malleable iron plant and will employ 500 men. The work is to begin within three months after the lease is given.

At New Orleans, La., Nathan S. Stern, for the past 18 years with the Schwartz Foundry Company, has secured possession of the Boland & Gschwind Foundry & Machine Shops. He has formed a company to operate the plant. Tom Roberts will be associated with Mr. Stern in the management of the business. Mr. Roberts is a fine mechanic and for some time was superintendent of the Shakespeare Iron Works, master mechanic of the New Orleans Railway Company, and at present is superintendent of the J. D. Connell Iron Works.

The Garford Company, Cleveland and Elyria, Ohio, has broken ground for its plant at Elyria, and although it placed important contracts for machinery some weeks ago, it has been buying more within the past couple of weeks.

The Kennedy Valve Mfg. Company has let contract for the construction of its new shops at Elmira, N. Y., and the work of building has already commenced.

The Reading Steel Castings Company, Reading, Pa., has taken off its first heat in the past week with entirely satisfactory results. The company recently re-equipped the old Boylson foundry at Reading.

The Pottsville Foundry & Stove Company has been chartered to construct and operate a plant at Pottsville. The men at the head of the enterprise are: Charles F. Derr, Pottsville, and S. F. Laucks and F. S. MacMillan, York, Pa.

The Bucyrus Steel Castings Company, Bucyrus, Ohio, is making rapid progress in the completion of its new plant, which includes a large foundry, machine shop and a power house. It is expected that the plant will be placed in operation about the middle of August.

The Bell & Fyfe Foundry Company, Brooklyn, N. Y., which recently leased the old Astoria steel foundry, at Astoria, L. I., which it will occupy and have in operation September 1, will then be in a position to make castings up to 50 tons.

The Fairmont Foundry Company, Fairmont, W. Va., is building a plant for general foundry work, making a few specialties, such as grate bars, brake shoes for mining and steam cars, sash weights, fronts for coke ovens, &c. The officers are: W. DeVries Goodwin, president and general manager, and John O. Morgan, secretary and treasurer.

The Zanesville Malleable Iron Company, Zanesville, Ohio, will place contracts immediately for the erection of an addition to its foundry. The new building will be 160 x 200 ft. A 15-ton melting furnace will be installed in the new foundry and other necessary equipment added. The present annealing room will be extended 100 ft. and five 20-ton annealing furnaces and machinery for polishing and cleaning castings will be installed.

Bridges and Buildings.

The Pennsylvania Steel Company has booked an order for the bridge building department of the Delaware & Hudson Company.

The Toledo-Massillon Bridge Company has commenced operations in its new bridge building plant on the outskirts of Toledo, Ohio. The company is fabricating a large amount of structural work for the new 16-story Ohio Building of Toledo. It has recently been awarded a contract for 400 tons of bridge work for the Big Four Railroad, 300-ton bridge for the Central Railroad of New Jersey, and a contract for the fabrication of 1200 tons of structural steel for the New York Central line. This work will be done at the Toledo plant, and the company has work enough on its books to keep both plants busy for a year.

Power Plant Equipment.

The Forest City Railway Company, Cleveland, which is building an extensive street railroad system in that city, has had plans completed for a power plant, and will shortly place contracts for steam and electrical equipment for the station, which will have an initial capacity of about 2000 hp. Fred. C. Alber is general manager.

The Commonwealth Realty Company, Toledo, Ohio, which is erecting a large hotel in that city, is placing contracts for the mechanical plant, including a 15-ton ice machine, an electric lighting plant, compressed air outfit and electric elevators.

A charter has been granted to the Henry, Millard & Henry Company, York, Pa., which will manufacture gas and gasoline engines and other appliances of that character at Eberson, near York. Joseph T. and Charles T. Henry and J. Brooks Millard are the incorporators.

The Paxtang Electric Company, Harrisburg, Pa., intends to enlarge its plant and is in the market for a 500-kw. generator, new engine and boiler. C. W. Lynch is president and Robert C. Neal, secretary and treasurer.

John Bellman of the Walsburg (Kan.) Machine Shop states that a deal has been made with the Clay Center Foundry Company whereby it will move its shop to Clay Center. The Giddings gasoline engine will be the principal article manufactured.

The Daub Mfg. Company, Pittsburgh, has been organized to manufacture gas engines, hydrocarbon burners and other goods, with a capital of \$85,000. The incorporators are A. F. Bennett, Pittsburgh; Frank Montgomery, Allegheny; W. J. Benson, Homestead; Oscar E. Daub, Crafton.

The Public Service Corporation of New Jersey has recently placed orders with the Westinghouse Machine Company, East Pittsburgh, Pa., for two 1000-kw. and one 500-kw. steam turbines, the first two to be installed in the plant at Cooper's Creek, Camden, and the latter at Cranford, N. J. The new station at Cooper's Creek will contain three turbines of 1000-kw. capacity, the first one having been ordered some time ago as an extension to the old Corliss engine equipment. This plant will have six 500-hp. Sterling Consolidated water tube boilers and will use Foster superheaters and Williamson condensing system.

The Huxley Mfg. Company has been incorporated at Buffalo, N. Y., with a capital of \$10,000, to manufacture valves of the Huxley patent. Directors are A. R. Jenkins, L. E. R. French and N. S. Hallett, Buffalo.

Hardware.

The Michigan Ladder Company, Ypsilanti, Mich., manufacturer of extension and step ladders, expects shortly to acquire additional property for the expansion of its plant. The company is in the market for a sticker and rip saw.

The Republic Metalware Company, Chicago, is having plans prepared for a warehouse to be built at 1532-1536 Wabash avenue, on ground 66 x 172 ft. Details of the building have not yet been completed.

The Challenge Mfg. Company has been incorporated under Maine laws to manufacture a patent baking pot, and will establish a factory at Waterville, Maine. The authorized capital stock is \$10,000, and the officers L. A. d'Argy, president, and C. G. Rancourt, treasurer.

The business of the Briggs Mfg. Company, Middletown, Conn., manufacturer of machine tools, dies and metal small wares, has been taken over by the Briggs Company, a Connecticut corporation with paid in capital of \$9700 and these officers: President, D. Luther Briggs, who was sole proprietor of the Briggs Mfg. Company's business; vice-president, Walter S. Wilcox; secretary, treasurer and business manager, Harry E. Powell.

The Hunt Mfg. Company, which recently removed its business from Antrim, N. H., to Greenfield, Mass., has incorporated in Massachusetts with capital stock of \$25,000 and these officers: President, David F. Hunt; treasurer, George H. Wilkins; clerk, Nettie A. Richards; directors, these officers and W. M. King and J. E. Donovan. The company will manufacture a line of apple parers and corers, hand or power, for evaporators, canneries, hotels, bakeries and domestic use.

The W. A. Ives Mfg. Company, Wallingford, Conn., formerly the Hamden Mfg. Company, manufacturer of boring implements, which has largely increased its facilities during the past year, is building another addition to the plant. The company reports a large demand for its products from both foreign and domestic trade.

The Iron and Metal Trades

Consumers of Iron and Steel who may have been holding aloof from the market a few weeks ago waiting for more light on the crop outlook seem to have put aside their doubts. The uncertainties about the renewal of midyear contracts that were a matter of comment in a few finished lines have been settled and the tonnage is now on the manufacturers' books. The Steel Bar situation in particular has greatly strengthened and some buyers of Structural Steel who hesitated are now committed.

Reports from buyers are of one tenor—that the beginning of the end of the heavy consumption of months is not yet in sight. The railroads, whatever the immediate state of the bond market, give no signs of letting down from the scale of buying that has recently prevailed and are making contracts indicating no fear of financial obstacles.

Pig Iron markets hold their strength. In the Chicago district Malleable Bessemer has advanced and in New England and Eastern districts the better sold furnaces have taken a firmer stand. In the Central West Bessemer Pig Iron capacity is being further curtailed and the market tends upward. Basic Iron in the East is also stronger. The decline in Pig Iron output, that has been continuous since March, has not yet been arrested, yet buying is so orderly and so evenly distributed that prices fluctuate little.

In the Billet market an incident of note is the importation of 5000 tons to be reexported in a finished form. The price at foreign port was in the neighborhood of \$22.50. The domestic supply of Steel shows little improvement.

Vessel work on the lakes keeps coming out for 1907 delivery. Two 600-ft. boats were let last week, and two are about to be placed for the Steel Corporation fleet.

Late Rail orders include the division of 40,000 tons for the Great Northern between the Steel Corporation and Buffalo mills. The Southern Railway has bought 30,000 tons for next year's delivery. New trolley road business is light, the financing of such projects being less easy in recent months.

The continuous stream of Structural contracts is an index of widely distributed prosperity. There is much bridge work pending. At Cleveland a Belt Line bridge, taking 4150 tons, has been let. In New York City a 4500-ton building order has been given out, and one for 15,000 tons is pending. Chicago is figuring on 3000 tons for two buildings.

In view of the selling of four to five months' product by the American Sheet & Tin Plate Company, the possibility of an advance in Sheets has received some attention.

Chicago has opened bids for 8500 tons of Cast Iron Pipe, and Dayton, Ohio, is buying 2500 tons.

A disposition appears to revise early estimates of Lake Superior Ore shipments, and 36,000,000 to 37,000,000 tons is the range of figures now put out. The wage advances of some weeks ago at Lake Iron mines seem not to have helped greatly in maintaining the labor supply.

In Eastern rolling mills the strike of iron workers is still unsettled, but the Eastern Bar Iron trade is in a position to stand some curtailment.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

July 17, July 10, June 20, July 19, 1906. 1906. 1906. 1905.

PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	\$18.25	\$18.25	\$18.50	\$16.25
Foundry No. 2, Southern, Cincinnati	16.00	16.00	16.25	13.75
Foundry No. 2, Local, Chicago..	18.25	18.25	18.00	16.25
Bessemer, Pittsburgh.....	18.60	18.10	18.35	14.85
Gray Forge, Pittsburgh.....	16.35	16.35	16.35	14.50
Lake Superior Charcoal, Chicago	19.00	19.00	19.00	16.50

BILLETS, RAILS, &c., Per

Gross Ton:				
Bessemer Billets, Pittsburgh....	27.50	27.00	27.00	23.00
Forging Billets, Pittsburgh.....	33.00	33.00	33.00	25.00
Open Hearth Billets, Phila.....	29.00	29.00	29.00	26.00
Wire Rods, Pittsburgh.....	34.00	34.00	34.00	32.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:

O. Steel Rails, Chicago.....	14.00	14.00	14.00	13.50
O. Steel Rails, Philadelphia.....	16.25	15.75	16.25	16.00
O. Iron Rails, Chicago.....	21.25	21.25	21.25	17.75
O. Iron Rails, Philadelphia....	20.50	20.00	20.50	17.50
O. Car Wheels, Chicago.....	18.00	18.00	18.00	14.25
O. Car Wheels, Philadelphia....	16.00	16.00	16.75	14.00
Heavy Steel Scrap, Pittsburgh..	15.75	15.75	15.50	14.00
Heavy Steel Scrap, Chicago....	13.50	13.00	13.00	13.00

FINISHED IRON AND STEEL,

Per Pound:				
Refined Iron Bars, Philadelphia.	1.63½	1.63½	1.63½	1.63½
Common Iron Bars, Chicago....	1.66½	1.66½	1.66½	1.50
Common Iron Bars, Pittsburgh..	1.50	1.50	1.50	1.55
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh.....	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.60
Beams, Tidewater, New York..	1.84½	1.84½	1.84½	1.74½
Beams, Pittsburgh.....	1.70	1.70	1.70	1.60
Angles, Tidewater, New York...	1.84½	1.84½	1.84½	1.74½
Angles, Pittsburgh.....	1.70	1.70	1.70	1.60
Skelp, Grooved Steel, Pittsburgh	1.57½	1.57½	1.57½	1.50
Skelp, Sheared Steel, Pittsburgh.	1.60	1.60	1.60	1.55

SHEETS, NAILS AND WIRE,

Per Pound:				
Sheets, No. 27, Pittsburgh.....	2.40	2.40	2.40	2.15
Wire Nails, Pittsburgh.....	1.85	1.85	1.85	1.80
Cut Nails, Pittsburgh.....	1.75	1.75	1.75	1.80
Barb Wire, Galv., Pittsburgh...	2.30	2.30	2.30	2.25

METALS, Per Pound:				
Copper, New York.....	18.37½	18.50	18.62½	15.00
Spelter, St. Louis.....	5.85	5.85	6.10	5.25
Lead, New York.....	5.75	5.80	5.90	4.55
Lead, St. Louis.....	5.70	5.70	5.90	4.50
Tin, New York.....	36.25	36.00	38.60	31.75
Antimony, Hallett, New York...	22.50	23.00	24.00	13.00
Nickel, New York.....	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer,				
100 pounds, New York.....	\$3.94	\$3.94	\$3.94	\$3.74

Chicago.

FISHER BUILDING, July 18, 1906.—(By Telegraph.)

Midsummer activity in the Iron and Steel trades continues marked and is characterized by heavy purchases of both raw and finished material to cover future needs. A shortage of low phosphorus Pig Iron, which is quoted at \$27.50, Pittsburgh, has resulted in the placing of an order by a large Western Steel casting interest with foreign makers for a cargo of 3000 tons at a price approximately \$22.50, Baltimore, and Basic amounting to about 7000 tons, largely for St. Louis delivery, was contracted for with Southern and Virginia operators by the same consumer. The purchase of 5000 tons of foreign Billets by a large implement manufacturer at a net cost almost equal to the prevailing price of domestic Steel, notwithstanding the drawback which will be allowed on the finished goods for export, emphasizes the shortage of Steel in this market for early delivery. The International Harvester Company during the week purchased a total of 10,000 tons of Malleable Bessemer from a local furnace and 5000 tons of Southern Iron. Scattering sales of 1000 and 2000 ton lots of Malleable Bessemer were numerous. The Illinois Steel Company and the Lackawanna Steel Company have made reservations for 160,000 tons of Rails for 1907 delivery for the New York Central lines, the order being equally divided between them, and a similar allotment of the 40,000-ton order for the same delivery by the Great Northern was made. Heavy sales of track material for next year's delivery continue to be made, one road having purchased 2500 tons of Spikes on the basis of 2c., Chicago. A Western road has contracted for 15,000 tons of Bridge Material with an Eastern mill, and specifications for several large buildings to be erected in this city ag-

gregating 3000 tons are being figured upon. Large orders for Steel are now being placed here by distributors for last half delivery, and specifications are in excess of mill shipments. Agreed quotations on Iron Bars are being shaded, an order for 1200 tons having been placed close to 1.60c. by an implement interest.

Pig Iron.—Due to the heavy purchases of the International Harvester Company and other interests, Malleable Bessemer has advanced sharply during the week and local furnaces are now asking \$18.50 for spot delivery, while Ohio stacks have advanced their quotations to \$16.50, furnace, equivalent to \$18, Chicago. We also note a sale of approximately 3000 tons of Lake Superior Charcoal Iron on the basis of \$19.25 to \$19.50, Chicago. Local Foundry Iron is scarce and is firmly held at \$18.25 to \$18.50, but only a small tonnage is available for early delivery. The buying of Southern Iron is of fair volume and standard grades are quoted at \$13.50, Birmingham, although off-Iron can be had at a concession of 25c. a ton. Virginia furnaces have re-established \$16, furnace, as the minimum on No. 2 Foundry and Basic, and are practically out of the market on the former for the remainder of the year. The Sloss-Sheffield Steel & Iron Company reports stocks of Gray Forge and Mottled amounting to 20,000 tons, but on higher grades practically no tonnage is in its yards. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal	\$19.00 to \$19.25
Northern Coke Foundry, No. 1	18.75 to 19.00
Northern Coke Foundry, No. 2	18.25 to 18.50
Northern Coke Foundry, No. 3	17.75 to 18.00
Northern Scotch, No. 1	19.25 to 19.50
Ohio Strong Softeners, No. 1	18.80 to 19.05
Ohio Strong Softeners, No. 2	18.30 to 18.55
Southern Coke, No. 1	17.65 to 17.90
Southern Coke, No. 2	17.15 to 17.40
Southern Coke, No. 3	16.65 to 16.90
Southern Coke, No. 4	16.15 to 16.40
Southern Coke, No. 1 Soft	17.65 to 17.90
Southern Coke, No. 2 Soft	17.15 to 17.40
Southern Gray Forge	15.90 to 16.15
Southern Mottled	16.85
Malleable Bessemer	18.50 to 18.80
Standard Bessemer	19.30 to 19.55
Jackson Co. and Kentucky Silvery, 6%	20.30 to 20.80
Jackson Co. and Kentucky Silvery, 8%	21.30 to 21.80
Jackson Co. and Kentucky Silvery, 10%	23.30 to 23.80

Cast Iron Pipe.—Bids were opened yesterday by the city of Chicago for 8500 tons of Cast Iron Pipe, ranging in size from 16 to 36 in., but no awards have yet been made. The city of Dayton, Ohio, will also contract for 2500 tons of Pipe this week. Prices are firm, as follows: Water Pipe, 4-in., \$32.50; 6, 8, 10 and 12 in., \$31.50; over 12-in., \$30.50, with \$1 extra for Gas Pipe. Large municipal contracts would take the above basis.

(By Mail.)

Billets and Rods.—The purchase of 5000 tons of foreign Billets by a local consumer for re-export in the form of finished material is one of the largest transactions recorded in the local Steel market for some time. These Billets were purchased on the basis of approximately \$26.50 Baltimore, but the drawback which will be allowed places the net cost far below the cost of domestic Steel. The Illinois Steel Company, notwithstanding reports to the contrary, is not selling Rolling Billets, its finishing mills and those of allied interests requiring the entire tonnage produced. A small tonnage of Forging Billets, however, is now available, and is being sold on the basis of \$35, gross ton, f.o.b. Chicago. The scarcity of Rods is pronounced, and the leading interest is making very few sales in the open market. We quote both Bessemer and Open Hearth Rods on the basis of \$35 to \$36, Chicago.

Rails and Track Supplies.—The Great Northern Railroad last week placed contracts for an additional 40,000 tons of Rails for 1907 delivery, of which the Lackawanna Steel Company received 20,000 tons and the remainder was awarded the local mill. We also note the sale of 2500 tons of Spikes for next year's delivery on the basis of 2c., Chicago. Premiums, however, prevail on this material for prompt shipment, as high as 2.30c. having been paid for small lots for early delivery. On Light Rails the Illinois Steel Company has its entire tonnage booked through September, and material for immediate requirements is now going to Eastern mills. Quotations are as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.25c. to 2.35c.; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$28 to \$29; 25-lb., \$30; 20-lb., \$30 to \$31; 16-lb., \$31 to \$32; 12-lb., \$32 to \$33, and lighter sections down to 8-lb., \$33 to \$40, f.o.b. mill. Standard Sections are unchanged at \$28, f.o.b. mill, full freight to destination.

Structural Material.—Specifications are now being figured on by fitters for several large buildings to be erected in this city, including an office building requiring 2000 tons and a warehouse 1000 tons. Specifications on all sizes of shapes have improved materially since the first of the month, and new orders are in excess of mill shipments. Quotations are unchanged, as follows: Beams and Channels, 3 to 15 in.,

inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work.

Plates.—While the new tonnage is comparatively light, specifications are increasing in volume, and on Sheared Plates the local mill is unable to make deliveries in less than 30 days. Notwithstanding the increased output of Universal Mill Plates, premiums are being paid to secure early deliveries. We continue to quote: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72-in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.20c.; 72-in. wide, 2.35c. to 2.45c.; No. 8, up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—The American Sheet & Tin Plate Company is now reported to have its entire output sold for the next four months, and independent mills are likewise sold well ahead. Sales from warehouse stocks are heavy and premiums prevail on car lot shipments. We quote as follows: Blue Annealed, No. 10, 1.91½c.; No. 12, 1.96½c.; No. 14, 2.01½c.; No. 16, 2.11½c.; Box Annealed, Nos. 17 to 21, 2.41½c.; Nos. 22 to 24, 2.46½c.; Nos. 25 and 26, 2.51½c.; No. 27, 2.56½c.; No. 28, 2.66½c.; No. 29, 2.81½c.; No. 30, 2.91½c.; Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 15 and 16, 2.81½c.; Nos. 17 to 21, 2.96½c.; Nos. 22 to 24, 3.11½c.; Nos. 25 and 26, 3.31½c.; No. 27, 3.51½c.; No. 28, 3.71½c.; No. 30, 4.21½c. Sheets from store: Blue Annealed, No. 12, 2.15c. to 2.25c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Box Annealed, Nos. 18 to 20, 2.60c. to 2.70c.; Nos. 22 to 24, 2.65c. to 2.75c.; No. 26, 2.70c. to 2.80c.; No. 28, 2.85c. to 2.95c.; No. 30, 3.25c. to 3.35c. Galvanized from store: Nos. 10 to 20, 3.10c. to 3.20c.; Nos. 22 to 24, 3.35c. to 3.45c.; No. 26, 3.45c. to 3.55c.; No. 27, 3.55c. to 3.75c.; No. 28, 3.85c. to 3.95c.; No. 30, 4.45c. to 4.55c.

Bars.—Large contracts continue to be made by leading consumers and distributors for their Steel Bar requirements to July 1 next year, the mill bookings thus far this month greatly exceeding the entire bookings of the month of June. Concessions on Iron Bars continue to be reported, and a sale of 1200 tons was made at Moline last week on a basis below the agreed price of 1.50c., Pittsburgh. We quote as follows: Iron Bars, 1.66½c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—Jobbers continue to place contracts to cover future requirements, and specifications are also heavy, the season considered. Prices, however, continue on an abnormally low basis and independent manufacturers are unable to compete. Sales continue to be made on the basis of 81 and 5 off the list, Pittsburgh, and discounts in car lots, Chicago, are as follows: Black Steel Pipe, 79.35 per cent. on the base sizes, ¾ to 6 in., and Galvanized, 69.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 in.

Boiler Tubes.—Little new tonnage is being offered the mills, although sales from store in small lots are numerous. Specifications, however, are satisfactory. Further mill concessions have been reported. Discounts on base sizes, 2¼ to 5 in., in car lots, are as follows: Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2½-in. and smaller and lengths over 18 ft., and 2½-in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	40	35	42½
1½ to 2¼ in.	50	35	35
2¼ in.	52½	35	30
2½ to 5 in.	60	47½	42½
6 in. and larger	50	35	..

Merchant Steel.—As practically all of the large consumers placed their contracts for all kinds of shapes in high grade Steel some months ago little new business is being closed. Specifications, however, are exceedingly heavy for the midsummer season, indicating a general resumption of the implement plants throughout the West. Prices are unchanged, as follows: Planished or Smooth Finished Tire Steel, 1.86½c.; Iron Finish, up to 1½ x ½ in., 1.81½c.; Iron Finish, 1½ x ½ in. and larger, 1.66½c., base; Channels for solid rubber tires, ¾ to 1 in., 2.16½c., and 1½-in. and larger, 2.06½c.; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.96½c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21½c.; Rail-

way Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Coke.—Western foundries are now covering their Coke requirements through the last half of the year, and one large interest has purchased its supply until July, 1907. By-Product Coke on contracts is quoted at \$5.50, Chicago, and in small lots for prompt delivery \$5.65 is asked. Connells-ville Coke is held on the basis of \$2.85 at the ovens, equivalent to \$5.50, Chicago.

Old Material.—Transactions are largely limited to the execution of short sales on the part of dealers who sold freely during the recent downward movement. Practically the entire offerings of the Atchison, Topeka & Santa Fé Railroad last week, amounting to 3500 tons, were taken by dealers to cover sales made at higher prices, and for this reason slightly better values than are quoted below were obtained for this material. With several of the Western Iron mills shut down for repairs the tonnage that is being taken by the consuming trade is exceedingly light and the market in practically all lines is easy, with a downward tendency. We continue quotations on gross tons, car lots, f.o.b. Chicago, as follows:

Old Iron Rails.....	\$21.25 to \$21.50
Old Steel Rails, 4 ft. and over.....	15.50 to 16.00
Old Steel Rails, less than 4 ft.....	14.00 to 14.50
Heavy Relaying Rails, subject to inspection, 50 pounds and under.....	27.00 to 27.50
Old Car Wheels.....	18.00 to 18.50
Heavy Melting Steel Scrap.....	13.50 to 14.00
Frogs, Switches and Guards.....	13.50 to 14.00
Mixed Steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates.....	\$16.00 to \$16.50
Iron Car Axles.....	22.00 to 22.50
Steel Car Axles.....	18.00 to 18.50
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 2 Railroad Wrought.....	12.50 to 13.00
Railway Springs.....	13.00 to 13.50
Locomotive Tires, smooth.....	14.00 to 14.50
No. 1 Dealers' Forge.....	11.00 to 11.50
Mixed Bushing.....	9.00 to 9.25
Iron Axle Turnings.....	9.00 to 9.50
Soft Steel Axle Turnings.....	8.75 to 9.00
Machine Shop Turnings.....	8.75 to 9.00
Cast Borings.....	7.00 to 7.50
Mixed Borings, &c.....	7.00 to 7.50
No. 1 Mill.....	8.50 to 9.00
No. 2 Mill.....	7.50 to 8.00
No. 1 Boilers, cut to Sheets and Rings.....	9.50 to 10.00
No. 1 Cast Scrap.....	13.50 to 14.00
Stove Plate and Light Cast Scrap.....	11.00 to 11.50
Railroad Malleable.....	13.50 to 14.00
Agricultural Malleable.....	12.50 to 13.00

Metals.—Dullness in Lead is responsible for a slight reduction in prices of 2½c. No other price changes have occurred during the week, although absence of any considerable buying of Copper for future delivery leads to the belief that prices may go lower later in the year. Nearly all the available Copper is, however, taken for the next two months and prices are likely to remain firm the greater part of that period. We quote: Casting Copper, 18¾c. to 18½c.; Lake, 18½c. to 19¼c., in car lots; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 39½c. to 40c.; small lots, 40½c. to 41c.; Spelter, prompt delivery, 6.15c. to 6.25c., for car lots; Lead, Desilverized, 6c. to 6.10c., for 50-ton lots; Corroding, 6.57½c. to 6.67½c., for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Cookson's Antimony, 28c., and other grades, 26c. to 27c.; Sheet Zinc is \$7.75 list, f.o.b. Lassel, in car lots of 60-lb. casks. On Old Metals we quote: Copper Wire, 16½c.; Heavy Copper, 16¼c.; Copper Bottoms, 15½c.; Copper Clips, 15¾c.; Red Brass, 15½c.; Red Brass Borings, 13¾c.; Yellow Brass, 12¼c.; Yellow Brass Borings, 10¼c.; Light Brass, 8¾c.; Lead Pipe, 5½c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 24c.; Tin Foil, 32c.; Block Tin Pipe, 27½c.

Birmingham.

BIRMINGHAM, ALA., July 16, 1906.

Pig Iron.—Sales the past week have been confined principally to small melters, and while probably as many orders have been entered as last week, the tonnage sold is considerably less. The prices now being made are very irregular, and in some instances important concessions have been made from last week's quotations. It is understood that several large interests have been feeling the market within the last few days, among which was the International Harvester Company, but no business was booked here, there being some 25c. to 50c. a ton difference in the views of the buyers and sellers. On account of so many buying from hand to mouth there is very little spot Iron obtainable, but the belief is becoming more prevalent that the sales for the last half of the year are not nearly so heavy as was supposed a couple of weeks since. It seems that none of the large interests placed the amount of business attributed to them and are now inclined to hold off for further concessions. Prices for Southern delivery are from \$13.25 to \$13.50, while small lots for shipment north of the Ohio river are still going at \$13. Labor conditions are retarding production

to a large extent and greater demoralization is to be expected during the harvesting season, which is only a month off.

Cast Iron Pipe.—No lettings in which Southern manufacturers are greatly interested have occurred within the past few weeks, but every day brings a certain amount of small business for repairs and extensions, keeping the foundries far behind with their orders. The extraordinary demand is making very stiff prices and quotations at present, for delivery during the latter part of the year, are about as follows on Water Pipe: 4 to 6 in., \$28; 8 to 12 in., \$27.50; over 12-in., \$26. Gas Pipe \$1 per ton extra.

Old Material.—The Scrap market has been very quiet the past week, with little demand for prompt shipment. Considerable inquiry for delivery during September and October is reported. No. 1 Cast is still the leading seller, with practically no demand for Wrought. Dealers are carrying good stocks in their yards, and while no very definite prices have been established, the following are understood to be approximately correct for shipment from dealers' yards here:

Old Iron Rails.....	\$18.50 to \$19.00
Old Iron Axles.....	18.00 to 18.50
Old Steel Axles.....	16.00 to 17.00
Old Car Wheels.....	16.50 to 17.00
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 2 Railroad Wrought.....	14.00 to 14.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	11.00 to 11.50
Wrought Pipe and Flues.....	11.50 to 12.00
Railroad Malleable.....	12.00 to 12.50
No. 1 Steel.....	11.00 to 11.50
No. 1 Machinery Cast.....	11.00 to 11.50
Stove Plate and Light Cast.....	8.50 to 9.00

The statement in last week's report that the Shelby Iron Company's blast furnace is the only one in the State of Alabama producing Charcoal Iron is an error. The Bass Foundry & Machine Company has a Charcoal blast furnace at Rock Run, Ala., which has been running steadily throughout this year, and as a matter of fact has not stopped except for necessary repairs and rebuilding since May, 1880.

Philadelphia.

REAL ESTATE TRUST BUILDING, July 17, 1906.

The Iron and Steel markets have assumed a very strong tone, and indifference has at last given place to the keenest kind of interest. The great fact that confronts the trade is that instead of larger supplies of Pig Iron there are smaller, and how to increase them is a perplexing problem. Early in the year it was estimated by competent authorities that there would be a considerable increase in the production of Pig Iron in 1906, but it is surprising to find that on the first of the month there were only 290 furnaces in active operation, against 313 January 1. The only explanation that can be given for this erroneous estimate is that many of the furnaces have been run so continuously that they have been forced out of blast, being no longer in physical condition to be worked efficiently. The estimates to which we refer have caused some confusion, although that they will ultimately work out correctly is not questioned. Meanwhile, as we said before, instead of more Iron there is less, and there is a lot of heart searching to decide just how to get around it. For the time being there is an unquestioned scarcity, more so in Steel making Irons than in anything else, but everything is scarce, prices in almost all cases being higher for deliveries in August and September than for the later months. Consumption is bound to be maintained the remainder of the year, and perhaps a long way beyond that, in which event the only chance for relief is in a larger production. Whether this can be done promptly enough or on a scale large enough to meet emergencies remains to be seen. Prospects are certainly very favorable from the seller's standpoint, and while some elements of uncertainty remain, the general understanding in regard to the position is that it is better than at any time of the year up to this date.

Pig Iron.—The demand is very good, and although the tonnage placed was of a pretty well distributed character, the greatest scarcity appears to be in Bessemer and Basic Irons, and it is clear that the June output showing a decrease of nearly 100,000 tons has to some extent changed the character of the market. Consumers have been feeling confident that there would be plenty of Pig Iron during the last half of the year, and it will be rather a rude shock to confront a possibility of being mistaken. The chances are, however, that July will reveal easier conditions, although furnacemen claim that a large number of furnaces are working badly and many may have to go out for a longer or shorter period. Furnaces coming in should turn out a large product per stack, as they are of the modern type and large capacity. Buying for the last quarter's requirements has not been large, but it is being figured on, with a fair probability that a great deal of business will be placed before the end of the month. Prices are somewhat irregular, but on the whole the tendency is slightly in the direction of higher figures. A fair average price for No. 2 X Foundry is about \$18.50 delivered, although occasionally buyers may do 10 or 15 cents better, but more frequently

sellers will gain a similar advantage, say \$18.60 to \$18.75. Many of the leading companies have marked up their prices to \$18.75 firm, but so far no large tonnages have been taken. Mill Irons are better, although sales at very low prices have been made; in one case \$15.75 delivered was accepted. It was iron on hand, however, and the buyer took immediate delivery. Ordinarily \$16.25 to \$16.50 is asked for first-class qualities, and it has been pretty well taken at the prices named. Basic iron is scarce, prices varying according to the conditions surrounding each particular case. A good buyer might get in at \$17.50 for the last quarter, but for shipments within the next 60 days \$17.75 to \$18 might have to be paid, according to circumstances. The full range from highest to lowest would be about as follows for Philadelphia and nearby deliveries:

No. 1 X Foundry.....	\$19.00 to \$19.25
No. 2 X Foundry.....	18.25 to 18.75
No. 2 Plain.....	17.75 to 18.00
Standard Gray Forge.....	16.25 to 16.50
Ordinary Gray Forge.....	15.75 to 16.00
Basic.....	17.60 to 17.85
Low Phosphorus.....	24.50 to 24.75
Malleable.....	18.75 to 19.00
Bessemer.....	19.85 to 20.00
Lake Superior Charcoal.....	21.00 to 22.00

Steel.—The local demand for Steel is not as good as it has been, but there is considerable inquiry from points at a distance. Some good business of this character has been secured because prompt shipments could be made, but there is little doubt that the local demand will fall into line soon. Prices are \$29 for ordinary Open Hearth Billets, perhaps a little less for a desirable order, and about \$31.50 to \$32.50 for Forging Billets.

Steel Alloys.—The market is hard to quote, as prices are governed by the circumstances in each particular case. About \$88 to \$90 would be quoted for July or August 80 per cent. Ferro, and \$80 to \$85 for later months; Spiegeleisen, about \$35 to \$36. The market is very feverish, however, as the conditions in southeastern Russia may at any time interfere with Ore shipments, so that quotations are liable to sudden change.

Plates.—There is nothing particularly new, although the mills are taking in a large tonnage of new business. The consumption of Plates was never larger than it is at the present time, and if it were not for the increased capacity mills would be swamped. As it is they are adding to their orders daily and have the most encouraging prospects for the remainder of the year. Prices are unchanged, as follows:

	Carload.	Part carload.
Tank, Bridge and Boat Steel.....	1.73½	1.78½
Flange or Boiler Steel.....	1.83½	1.88½
Marine.....	2.13½	2.18½
Locomotive Fire Box Steel.....	2.23½	2.28½
The above are base prices for ¼-inch and heavier. The following extras apply:		
3-16-inch thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 inches.....		.05
Plates over 110 to 115 inches.....		.10
Plates over 115 to 120 inches.....		.15
Plates over 120 to 125 inches.....		.25
Plates over 125 to 130 inches.....		.50
Plates over 130 inches.....		1.00

Structural Material.—There is nothing but the usual report of satisfactory conditions at all the mills. Orders to local mills are mostly for prompt shipment, which in the majority of cases can be given without much difficulty, as a portion of their capacity is reserved for casual orders. Prices are unchanged, as follows: Beams, Angles and Channels, 1.83½c. to 2c., delivered.

Bars.—The Bar Iron trade is in a peculiar condition, but it is improving. There is a partial suspension of work at some of the mills, owing to wage disputes, which with the regular period for stock taking, repairs, &c., has reduced stocks somewhat and puts manufacturers in a better position when quoting on new business. There is more inquiry and quotations are firm, and by the end of the month it is believed that a great deal of business will have been secured. Steel Bars cannot be delivered as promptly as during last month, but prices for both Iron and Steel are unchanged, at 1.63½c. to 1.68½c.

Sheets.—The demand is quite satisfactory, although not as urgent as in the previous two or three weeks. Everything was pretty well cleaned up at that time, however, so the mills can be kept pretty well employed. Prices are about as follows, for medium sized lots, about a tenth less being asked for mill shipments: No. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—The market is better in spots; in others there is very little change. Steel Scrap is decidedly better and there is a better feeling in Foundry Scrap, but the strikes in the Reading and Lebanon districts prevent a good deal of buying which might otherwise be done in that territory. Prices cannot be given very accurately, but as nearly as possible bids and offers are about as follows for deliveries in buyers' yards:

Scrap Steel Rails and Crops.....	\$16.25 to \$16.50
No. 1 Steel Scrap.....	16.00 to 16.25
Low Phosphorus Scrap.....	20.00 to 21.00
Old Steel Axles.....	18.50 to 19.00
Old Iron Axles.....	25.00 to 26.00
Old Iron Rails.....	20.50 to 21.50
Old Car Wheels.....	16.00 to 16.50
Choice Scrap, R. R. No. 1 Wrought.....	17.50 to 18.50
Choice No. 1 Yard Scrap.....	15.50 to 16.50
Long and Short.....	14.50 to 15.00
Machinery Scrap.....	15.00 to 15.50
Wrought Iron Pipe.....	12.50 to 13.00
No. 1 Forge Fire Scrap.....	13.00 to 13.25
No. 2 Light Ordinary.....	10.00 to 11.00
Wrought Turnings.....	11.50 to 12.00
Axle Turnings, Choice Heavy.....	12.00 to 12.50
Stove Plate.....	10.50 to 11.00
Cast Borings.....	9.25 to 9.75

Cleveland.

CLEVELAND, OHIO, July 17, 1906.

Iron Ore.—The movement of Ore down the lakes is continuing at about the same pace as shown heretofore. At the outset the shippers were hopeful of moving close to 6,000,000 tons for this month. The boat capacity is evidently adequate to such a movement, but it is extremely doubtful whether such a record will be shown. Shippers are averse to paying docking charges at Lake Erie ports and insist upon a direct movement. The car supply has not been adequate to take care of all the Ore being brought down the lakes, resulting in frequent statements that vessel tonnage is being delayed at the lower lake ports. This delay has cut down the tonnage applying for cargoes at the head of the lakes, and in consequence there has not been a test of the productive capacity of the mines. Mine owners have recently increased wages, but report that this has not overcome completely the labor shortage. The vessel market is about steady at the old rates of transportation—namely, 75c. from Duluth to Ohio ports, 70c. from Marquette and 60c. from Escanaba. High grade Ores are in demand and are scarce. A few sales of small lots are reported at a premium.

Pig Iron.—There is such a shortage of Foundry Iron for spot shipment that some of the foundries in this territory have been greatly interfered with. One large foundry in Cleveland shut down for this week, and various smaller shops are reported as having been shut down from three days to a week until the Iron could be delivered. Southern Ohio has been able to ship small quantities into this section, and northern New York has had some Iron for quick delivery. The bulk of the business, however, has come from the South, and northern Alabama stacks have been fairly liberal shippers here. The two consumers who were in the market a week ago for 1000 tons of Foundry Iron each have closed for parts of their needs. It was necessary to divide the contract among several furnaces to get the deliveries that were desired. Prices are \$17 in the Valleys for Northern No. 2, and \$13.50, Birmingham, for Southern No. 2. Reports indicate the probability of a shortage of Bessemer and Basic in this market in the near future. The amounts that could be sold for spot shipment are small, while the demand is good. Prices are maintained at \$17, Valley furnace, for Basic, and \$17.25 to \$17.50 for Bessemer.

Finished Iron and Steel.—The buying of ships for 1907 delivery is still a feature of the local market. During the past week a contract was placed by a merchant fleet with a Toledo builder for the construction of two ships of the prevailing size, about 600 ft. long. Negotiations are now being made for the purchase of this steel. Since the boats are not for any of the Steel making companies this material is likely to be bought in the open market. Another order is pending for two ships for the Pittsburgh Steamship Company, the lake end of the Steel Corporation. Lake shipyards have been specifying heavily against old contracts for material, and that good deliveries are being made is evidenced by the fact that new records in shipbuilding are reported. One ship has just been turned out in 45 days' actual working time. The demand for Steel is therefore strong, being complicated by a good demand for material for general building, which is actively under way in this territory. The city of Cleveland will soon be in the market for Shapes for the rebuilding of an old viaduct and for the construction of a new high level bridge. The Billet situation is strong. Forging Billets are now selling at \$32 to \$33 at the mills, and 4 x 4 in. at \$28 to \$29 in Cleveland. There is a good demand for Sheets, and the mills are having some difficulty in filling orders. Out of stock prices are 2.15c. for No. 12 Blue Annealed, 2.85c. for No. 28 One Pass Cold Rolled and 3.85c. for No. 28 Galvanized. The Bar Iron market is stronger, as some of the mills are idle. Those which are running are well sold up. While the price is nominally 1.50c., Pittsburgh, in reality it is stronger than the price indicates. Bar Steel is strong and in active demand, with the price unchanged at 1.50c., Pittsburgh, for both Bessemer and Open Hearth.

Old Material.—For the time being the market is quiet and prices are largely nominal. The following represent dealers' prices to the trade, f.o.b. Cleveland, gross tons: Old Steel Rails, \$14.50 to \$15; Old Iron Rails, \$21 to \$22; Iron Car Axles, \$18.50 to \$19.50; Heavy Melting Steel,

\$14.50. Net tons: Cast Borings, \$8.50 to \$9; No. 1 Busheling, \$12.50 to \$13; No. 1 Railroad Wrought, \$16; No. 1 Cast, \$14 to \$14.50; Iron and Steel Turnings and Drillings, \$9.50 to \$10.50.

Cincinnati.

FIFTH AND MAIN STS., July 18, 1906.—(By Telegraph.)

Pig Iron.—The sales made during the past week, while mostly of small tonnage, have aggregated a considerable total, and the general situation is thought to be one of strength. A large percentage of melters are said to have well covered for the third quarter and are apparently not interested in anything beyond, evidently satisfied to wait until future requirements shall demand further action. It appears to be a well defined fact that considerably more Iron was sold during the past 30 days than was at first supposed, the probabilities being that large quantities were disposed of that never gained publicity. Northern Irons are very strong, the tendency being toward higher prices. It is reported, however, that most of the furnaces are well sold up for the remainder of the quarter and in some instances throughout the year, and are not anxious to contemplate any sales beyond that period. So far as Southern brands are concerned, there is apparently little change in the situation from that of a week since, and while some of the furnaces are quoting \$13.50, Birmingham basis, it is said concessions are being made of 20 to 50 cents below that figure. Local foundries are fairly busy, notably along special lines. Predictions seem to indicate that the general situation will undergo but little change until it is plainly manifest what will be the requirements for the last three months of the year. There is a large inquiry from a large Eastern melter for Gray Forge which may probably establish a quotation on that grade below schedule. One of the large agricultural concerns is said to have bought 5000 tons on an analysis basis at \$13 for No. 2 Birmingham. Freight rates from Hanging Rock district to Cincinnati are \$1.15 and from Birmingham \$3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$16.50 to \$17.00
Southern Coke, No. 2.....	16.00 to 16.50
Southern Coke, No. 3.....	15.50 to 16.00
Southern Coke, No. 4.....	15.00 to 15.50
Southern Coke, No. 1 Soft.....	16.50 to 17.00
Southern Coke, No. 2 Soft.....	16.00 to 16.50
Southern Coke, Gray Forge.....	14.75 to 15.25
Southern Coke, Mottled.....	14.25 to 14.75
Ohio Silvery, No. 1 (8 per cent. Silicon).....	21.65 to 22.15
Lake Superior Coke, No. 1.....	18.15
Lake Superior Coke, No. 2.....	17.65
Lake Superior Coke, No. 3.....	16.65 to 17.15

Car Wheel Irons.

Standard Southern Car Wheel.....	\$24.00 to \$24.25
Lake Superior Car Wheel.....	22.50 to 22.75

Coke.—The demand is fairly active and prices are strong. The available supply is plentiful and shipments are coming forward with normal regularity. We quote the best brands of Connellsville and Virginia Foundry from \$2.85 to \$3, f.o.b. ovens.

Finished Iron and Steel.—Conditions are apparently unchanged and all the mills are busy. Bar Iron is said to be very strong, with an active demand. Structural Shapes and Plates are strong and prices unchanged. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in small lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.83c., in carload lots.

Old Material.—Dealers advise that while there is quite a little tonnage being disposed of there is an absence of that firmness that they would like to see. Very little Railroad Scrap is coming forward at present. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$14 to \$14.50 per net ton; Cast Borings, \$5 to \$6 per net ton; Steel Turnings, \$7 to \$8 per net ton; No. 1 Cast Scrap, \$12 to \$13 per net ton; Iron Rails, \$19 to \$20 per gross ton; Steel Rails, rolling mill lengths, \$14 to \$15 per gross ton; Relaying Rails, 56 lb. and upward, \$28 to \$29 per gross ton; Iron Axles, \$21 to \$22 per net ton; Car Wheels, \$17 to \$18 per gross ton; Low Phosphorus Scrap, \$18 to \$19 per gross ton.

The Dominion Bureau of Inspection and Tests has, been established at Sydney, Nova Scotia, for the inspection of rails, cars, locomotives, structural work, &c., with A. W. Neuls, president, and George S. McQuarrie, secretary-treasurer. Einar Guttormsen is civil engineer and A. B. Stienmetz is chemist.

Pittsburgh.

PARK BUILDING, July 18, 1906.—(By Telegraph.)

Pig Iron.—The market is quiet as far as sales go, but prices are very firm. It is commencing to look as though we might have a famine in Bessemer Pig Iron, as it is not only scarce, but the shortage in supply will be aggravated by the blowing out of a number of furnaces in the two Valleys that have been running on Bessemer. For delivery up to September 1 we quote Bessemer Pig Iron at \$17.75, Valley furnace, but it is possible that one or two makers might sell at less than this figure. Basic Pig Iron is firm at \$17 to \$17.25, Valley furnace. We note sales of about 1000 tons of Bessemer for prompt delivery at \$17.75, Valley furnace. There is more demand for Foundry Iron and prices are firmer. We quote Northern makes of No. 2 at \$16.50 to \$16.75, Valley furnace, and can report sales of about 1500 tons at the first named price. There is more inquiry for Forge Iron, and we quote Northern makes at \$15.50 to \$15.65, Valley furnace, or \$16.35 to \$16.50, Pittsburgh.

Steel.—There is a continued shortage in the supply of Billets and Sheet and Tin Bars, and the outlook is that it will be some time before there is enough Steel to go around. We quote Bessemer Billets at \$27.50 and Open Hearth Billets at \$28 to \$28.50, Pittsburgh. Forging Billets are extremely scarce and for prompt delivery would probably bring close to \$33, Pittsburgh. We quote Sheet and Tin Bars, in random lengths, at \$29, Pittsburgh, actual freight to destination being added. An advance of 50c. a ton is charged for Cut Bars.

Steel Rails.—The Carnegie Steel Company has entered orders in the past week for about 45,000 tons, of which the Southern Railway Company placed 30,000 tons and the Lehigh Valley 5000 tons, all for next year's delivery. Prices on Light Rails are very firm and the demand is heavy.

(By Mail.)

The scarcity of Bessemer Pig Iron is becoming more acute, and to-day it can hardly be had at any price. No less than four furnaces that run on Bessemer have either blown out or will go out in a few days, these being Claire, Girard, Ella and Youngstown Steel. These furnaces make about 1200 tons per day or more, and this much Iron being taken off the market will be seriously felt. Bessemer Pig for delivery up to September readily brings \$17.75 at Valley furnace. Basic Iron is also firm at \$17 to \$17.25 at Valley furnace, while Foundry Iron is in better demand than for several months and prices are firmer. There is more inquiry for Forge Iron and the tone of the market is stronger. Steel Billets are very scarce and bringing top prices. Bessemer Billets on contracts are bringing as high as \$27.45, Pittsburgh. Open Hearth Billets for July and August delivery bring from \$28.50 to \$29, Pittsburgh, and the supply is limited even at those high prices. The situation in Finished Iron and Steel could hardly be stronger and the new tonnage being entered by the mills is much heavier than at any time for several months. In fact, for a midsummer season the present situation in the Iron trade is remarkably strong, and gives every indication that great activity will prevail in the fall and winter months. Some heavy orders are being entered for Rails for next year's delivery, while the new tonnage in Plates and Structural Material is unusually large. In Sheets the mills are well sold up to the close of the year. Some very large orders for Line Pipe have been placed and others are pending. The Scrap market is somewhat quiet, but Furnace and Foundry Coke are in active demand and prices are higher.

Ferromanganese.—There has been an active demand and we note sales of about 2500 tons for extended delivery, part of which runs into next year. Prices ranged from \$79 to \$85 a ton. Foreign 80 per cent. Ferro for prompt delivery brings \$85 to \$90 a ton. It looks as though prices would continue high for some time.

Muck Bar.—There is some inquiry in the market and a sale of 500 tons is reported at about \$28.50, Pittsburgh. We quote best grades of Muck Bar made from all Pig Iron at \$28.50 to \$29, Pittsburgh.

Wire Rods.—The scarcity and high prices of Billets are having the effect of keeping up prices on Rods, which are firm, and for which we note some inquiry. We quote Bessemer and Open Hearth Rods at \$34 to \$34.50, Pittsburgh.

Skelp.—Prices on both Iron and Steel Skelp are firm, and the mills are busy on contracts on which buyers are specifying freely. We quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Structural Material.—Inquiries have been more plentiful in the past week and a good deal of work is in sight. The American Bridge Company has taken 4150 tons from the Cleveland Belt Railroad for a bridge over the Cuyahoga River, and the McClintic-Marshall Company and the Pittsburgh Steel Construction Company have entered some good

sized contracts in the past week. These three Structural interests are pretty well filled up for the balance of this year. The mills are making fairly prompt deliveries, but on the medium sizes of Beams and Channels are still somewhat behind in shipments. Prices are firm, and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x 1/4 in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—New business in Sheared Plates is much better, the mills having entered some large orders in the past week for Plates to go into Gas Lines, which are referred to elsewhere in this report. On Universal Mill Plates the mills are from three to four weeks behind in deliveries. Prices are firm, but on the narrow sizes, from 6 1/4 in. up to 14 in., some of the mills are shading prices from \$1 to \$2 a ton. We quote: Tank Plates, 1/4 in. thick, 6 1/4 in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than 1/4-inch to and including 3-16-inch Plates on thin edge.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Fire Box Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of 1/2 of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are entering a heavy tonnage in both Black and Galvanized Sheets, and are from 60 to 90 days behind in deliveries. The American Sheet & Tin Plate Company is understood to have its entire capacity in both Black and Galvanized Sheets practically sold up for the rest of this year. On account of the great scarcity and advancing tendency in prices of Sheet Bars some in the trade believe that an early advance in both Black and Galvanized Sheets will be made. As yet nothing official in regard to this has been given out. Prices are firm and for prompt deliveries, especially on Galvanized Sheets, some mills are asking premiums. We quote: Nos. 10 and 12 gauge, 1.75c. to 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 2c.; Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.65c., and No. 30, 2.75c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.80c., and No. 30, 4.05c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.75 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at \$3.10 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—The mills are receiving numerous specifications on contracts for both Iron and Steel Bars and shipments at present are larger than for some time. It is understood that the Republic Iron & Steel Company has entered a heavy tonnage for Iron Bars and its mills in the Youngstown, Ohio, district, which closed down on July 1 for inventory and repairs, were started up again in full on the 16th. New business in Steel Bars is also quite heavy, the Carnegie Steel Company and Jones & Laughlin Steel Company having more orders on their books than at any time for several months, and are somewhat behind in deliveries. Prices are firm. We quote Iron and Steel Bars at 1.50c., base, half extras for carloads and larger lots.

Hoops and Bands.—New business being placed with the mills is larger, while specifications on contracts continue to come in freely. We quote Steel Hoops at 1.90c. and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Tin Plate.—While the new tonnage in Tin Plate being entered by the mills is rather light, yet contracts taken some time ago on which consumers are specifying very freely will take a good part of the output of the leading makers for the balance of the year. There is still a great scarcity in Tin Bars, and some of the independent Tin Plate mills, as well as some of the mills belonging to the American Sheet & Tin

Plate Company, are not being operated to full time, owing to lack of Bars. We quote Tin Plate at \$3.75 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in ten days, on which price a rebate of 5c. a box is allowed for carloads and larger lots.

Railroad Spikes.—The demand continues unusually heavy, and the three local concerns that make Spikes have their product sold up for the next two or three months. The S. Severance Company is rushing work on its new Spike mill at Glassport, and hopes to have it in operation in September. We quote Railroad Spikes at \$2.20 to \$2.25 per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—The mills are receiving heavy specifications on contracts for Shafting, Steel Bars and other forms of Merchant Steel, shipments being larger than for some time. New business being placed is rather light, but most of the leading consumers covered their requirements some time ago. Prices are firm but unchanged, as follows: Planished or Smooth Finished Tire Steel, 1.70c.; Iron Finish, up to 1 1/2 x 1/2 in., 1.65c., and Iron Finish, 1 1/2 x 1/2 in. and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: 3/4, 7/8 and 1 in., 2c., and 1 1/4-in. and larger, 1.90c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.75c. to 1.80c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Spelter.—The demand is rather dull and prices are weak. We quote best grades of prime Western Spelter at 5.82 1/2c., St. Louis, equal to 5.95c., Pittsburgh.

Merchant Pipe.—Some large contracts for Line Pipe are in the market and others are pending. An export inquiry for 275 miles of 8 to 12-in. Line Pipe, for the Burmah Oil Company, Burmah, India, is in the market, and if placed will likely go to the leading interest. The United States Steel Products Export Company is handling this inquiry. A local pipe company has taken a contract for 65 miles of 8-in. and 7 miles of 12-in. for Indian Territory. The Youngstown Sheet & Tube Company has taken 25 miles of 12-in. Line Pipe for the Kansas Natural Gas Company, while the National Tube Company has taken about 1700 tons of 4 1/2 to 12 1/4 in. Line Pipe for the Wichita Natural Gas Company of Kansas. Spang, Chalfant & Co., Incorporated, have taken 4 miles of 10-in. Line Pipe for the Philadelphia Company. Other large inquiries for Line Pipe are in the market. The leading mills are now filled up for the next two or three months. On the Merchant sizes of Line Pipe a slight advance in prices has been made. We also note a heavy demand for Merchant sizes of Pipe and last week the National Tube Company made a record breaking shipment of Merchant Pipe to San Francisco. In spite of the heavy tonnage being placed, and the fact that the mills are sold up for the next two or three months, there are no indications of an advance in prices of Merchant Pipe, the extreme discount on Merchant sizes of Steel Pipe remaining at 81 and 5 per cent. off to the large trade. Official discounts for carloads, which continue to be shaded one point or more, are as follows:

Merchant Pipe.			
Jobbers, carloads.			
Steel.			
	Black.	Galv.	Black.
1/4 and 1/2 in.....	72	56	60
3/4 in.....	74	60	71
1/2 in.....	76	64	73
3/4 to 6 in.....	80	70	77 1/2
7 to 12 in.....	75	60	72 1/2
Extra strong, plain ends:			
1/4 to 1/2 in.....	65	53	62
3/4 to 4 in.....	72	60	69
4 1/2 to 8 in.....	68	56	65
Double extra strong, plain ends:			
1/4 to 8 in.....	61	50	58

Boiler Tubes.—We note a continued heavy demand for Locomotive and Merchant Tubes, and buyers are specifying very freely on contracts. On carload business prices are being firmly held, but in some cases on less than carloads some shading is being done. Discounts in carloads are as follows:

Boiler Tubes.		
	Iron.	Steel.
1 to 1 1/4 in.....	45	50
1 1/4 to 2 1/4 in.....	45	62
2 1/4 in.....	50	64
2 1/4 to 5 in.....	57	70
6 to 13 in.....	45	62

Iron and Steel Scrap.—With the starting up of many of the mills that were closed down on July 1 for inventory and repairs, it is believed that the demand for Scrap, which has been dull, will soon show betterment. Prices on Heavy Steel Scrap, in sympathy with Bessemer Pig Iron, are firmer, and it is held at \$15.75 to \$16, Pittsburgh, per gross ton. Dealers quote other grades of Scrap as follows: Bundled Sheet Scrap, \$13.75 to \$14; No. 1 Wrought Scrap, \$17.25 to \$17.50; Machinery Cast Scrap, \$15.50; Cast Iron Borings, \$8.25 to \$8.50; Old Steel Rails, short pieces, \$15.50 to \$15.75; Old Steel Rails, rerollers, \$17.25 to \$17.50; Axle Turnings, \$12.50; Stove Plate, \$10.25 to \$10.50; Wrought

Turnings, \$11.50 to \$11.75; all in gross tons, f.o.b. Pittsburgh.

Coke.—The demand for both Furnace and Foundry Coke continues active, and prices are firm and higher. We quote best grades of Connellsville Furnace Coke at \$2.50 to \$2.60 and 72-hr. Foundry Coke at \$2.75 to \$2.90 at oven. The output of Coke continues heavy, the upper and lower Connellsville regions having made last week a little over \$64,000 tons. Activity in the building of Coke ovens is increasing, and at the present time upward of 1000 ovens are being built in the Connellsville region.

The German Iron Market.

BERLIN, July 5, 1906.

The price situation in the German Iron trade is still firm, but the upward movement seems now to have come almost to a standstill. Several advances, however, have been reported since my last letter was written. The association controlling Street Car Wheels has added 2 marks per metric cwt. In general goods several dealers' combinations have recently marked up prices to correspond with the new prices of manufacturers. In the hardware trade, too, a pretty general advance in prices was undertaken above a week ago.

Trade Continues Active.

So far as all the market reports indicate, the activity in all departments of the trade continues unabated. Nowhere is there any indication of any weakening in the general situation. Certainly the latest statistics of production in the Iron industry give no warrant for the belief that the tide is beginning to turn. The make of Pig Iron in May reached 1,048,150 metric tons, which is 37,360 tons more than in April, and 96,700 tons more than in May, 1905. The shipments of the Steel Verband, too, are still rising. The movement in May was 522,571 tons, being a gain of 12½ per cent. over April, and nearly 6 per cent. over May, 1905. Shipments were more than 13 per cent. above the allotments. The May movement was exceeded only by that of March, but the Verband points out that the daily shipments in May averaged even higher than in March.

The arrivals of foreign Ores are referred to in market reports as having undergone an improvement in some directions. This is particularly the case with Manganese Ores from the Caucasus. The famine in those Ores is over and prices have returned almost to their normal level. Spanish Ores, too, although their prices remain unchanged, are cheaper to the German furnaces, since there has been a reduction in the cost of shipment. At the moment much concern is felt in the trade over the apparent failure of the negotiations for a commercial treaty between Germany and Spain, and the possibility of a tariff war between the two countries. It is feared that such a disaster might prove a serious matter for German furnaces. The recently ratified treaty between Sweden and Germany excludes the possibility of an export duty on Swedish Ores before the end of 1910, about which the German Ironmen have been more or less agitated for a year or two. The supply of Swedish Ores available for German furnaces is scarce, especially in grades rich in phosphorus, and the prices are still tending higher. The bidding of American consumers is mentioned in this connection as a disturbing factor. So far as the home supply of Ores is concerned the outlook is improving. New mines are being opened up and some abandoned deposits of Ores are being successfully worked again.

The difficulty in placing an order for rivet stock for export to Japan affords a good illustration of conditions now prevailing in the German Iron trade. This order was first offered to the Upper Silesian Verband, then successively to two of the great establishments in the Rhenish district; but everywhere the reply was that it could not be filled this year. It is not known whether it has yet found a taker.

Syndicate Matters.

The reopening of the question of giving export bounties, mentioned in my last letter, resulted in the decision of the Pig Iron Syndicate to continue the bounty for another quarter, but its prolongation beyond the end of September is made conditional upon the adoption of a similar course by the Coal Syndicate. As the latter has already rejected this proposal we are evidently near the end of the period of export bounties, except the reduce bounty of the Steel Verband that will remain in force.

The announcement mentioned in my last letter that the Siegen Pig Iron Syndicate, which controls the German production of Spiegeleisen, had been prolonged through the failure of any member to give notice of withdrawal turns out to have been premature. At the last moment one of the producers notified his withdrawal. Negotiations will now have to be taken up to secure the renewal of the combination, and it is believed that they will succeed. The Düsseldorf Syndicate has renewed its arrangement with the independent Kraft Works, near Stettin, for the maintenance of common

prices, and the new furnace at Lübeck, which will be blown in early next year, is included in this arrangement. The latter establishment, it is reported, has already sold its first year's production to a large firm of Rhenish dealers. This arrangement also includes the first year's output of the recently organized furnace at Emden, but this news has been questioned, and, indeed, seems rather doubtful. The Emden organization was effected barely a month ago.

The attempts to renew the Wire Nail Syndicate upon a broader basis have been continued.

Coke and Coal.

The May production of Coke was the heaviest ever registered, reaching 1,713,565 metric tons for the month. This exceeds the April output by 103,550 tons, and that of May, 1905, by 271,000 tons. For the first five months of the year the Coal production was 56,916,000 tons, as compared with 47,288,000 tons last year, when the production was abnormally low, owing to the great strike in January and February. Coke production for five months was 8,147,000 tons, as against 5,122,000 tons last year.

The situation in the Coal trade has become still more strained, if anything, since my last report. The syndicate has not only been compelled to let its seaport customers buy English Coal, but is importing it into the Rhine country itself. Not even these measures, however, have sufficed to relieve the scarcity, and latterly the syndicate has been re-shipping into the Coal district amounts which have been previously sent to remoter parts of the country for replenishing stocks. The scarcity of Coking Coal has grown very troublesome and the producers have had to resort to the use of qualities not well adapted for coking. Some ovens mix in as much as 50 per cent. of such Coal with regular coking qualities.

The annual convention of the Association of German Machine Tool Manufacturers was held several days ago at Nuremberg. A decided improvement in the state of business was reported at this meeting. This improvement, however, it was said, was confined chiefly to the expansion of business; prices remained under pressure from too much competition and profits have been further restricted by the increased cost of raw materials. The fact was pointed out at this meeting that the imports of machine tools from the United States are increasing, which is claimed to show that the German duty is too low; whereas the American duty of 45 per cent. prevents the exportation of German machine tools to the United States.

New York.

NEW YORK, July 18, 1906.

Pig Iron.—Some of the larger consumers of Foundry Iron who have followed the policy of intermittent purchases of moderate lots are now asking for 1000 tons in one case, 1000 tons in another and 500 tons in a third. Business over 500 tons is exceptional. One Lehigh Valley interest has advanced its quotations 25c., and one of the lesser Southern companies is asking \$13.75 at furnaces, with \$3.75 freight to this market. The close competition for New England business in evidence a few weeks ago has disappeared, and Western New York sellers are asking more money. Consumers appear to have provided for their wants into September, but as a rule are not yet taking Iron for the fourth quarter. Buyers of Basic Iron are well supplied for the third quarter, and the current business is limited to spot lots. We quote Northern Pig Iron No. 1 at \$18.50 to \$19; No. 2 at \$18 to \$18.25, and No. 2 Plain at \$17.25 to \$17.50, tidewater. Southern Iron is sold at \$18.25 to \$18.50 for No. 1, and \$17.25 to \$17.50 for No. 2, with a \$4 freight rate from Birmingham.

Steel Rails.—Though considerable large business for 1907 is still pending, the sales of the week have been few. The Lehigh Valley has contracted for part of its requirements, and will probably take upward of 10,000 tons in all. The Chicago Great Western bought 2000 tons for 1907 delivery, and the Pittsburgh, Shawmut & Northern 1000 tons for 1906. Trolley line tonnage has fallen off. Financing of such projects encounters more difficulties.

Structural Steel.—Some of the fabricating companies are reserving space for important New York work that is quite sure to be awarded a little later. Conditions as to deliveries are easier, but not because the supply of work has fallen off. All the erecting works are able to make a better output, shop organizations having improved steadily. For the first half of July the American Bridge Company has booked 29,000 tons. Its largest contract of the week is that for the Martin office and loft building, which will occupy the old Broadway Tabernacle site at Broadway and Thirty-fourth street, with considerable adjoining ground that has been acquired from time to time. The enlarged plans for this work will bring the total of Steel up to about 4500 tons. A bridge contract let by the Brookville & Mahoning Railroad amounts to 2000 tons. At Philadelphia the Armstrong

& Latta Building has been let, calling for about 500 tons. For the Open Hearth furnace work and some additional building construction of the J. A. Roebling's Sons Company, at Kinkora, N. J., Milliken Brothers have a contract amounting to about 1000 tons. The important railroad bridge lettings that have been spoken of recently, including 6000 tons for the Western Pacific, are still pending. In New York City the plans for the City Investment Company's Building on Cortlandt street, with a considerable frontage on Broadway, have reached the point of letting the foundation contract. The Steel contract will follow soon. The general Structural Steel market is in excellent shape. New buying is going on steadily, though the large contracts of jobbers and consumers let a little more than a year ago are not being repeated, the usual course being to buy for three to six months' delivery. We continue quotations for mill deliveries at tidewater as follows: Beams, Channels, Angles and Zees, 1.84½¢; Tees, 1.89½¢; Bulb Angles and Deck Beams, 1.99½¢. On Beams 18 to 24 in. the extra is 0.10¢, and on Angles over 6 in., 0.10¢. Beams and Channels out of stock are sold at 2½¢.

Bars.—The situation continues virtually the same as has been reported for some time. The mills are securing a moderate volume of business in both Iron and Steel, with inquiries from large purchasers. The labor difficulties with which some of the Eastern mills are contending have not yet been settled. Prices for mill shipments are maintained at 1.64½¢, tidewater, for either Iron or Steel Bars.

Plates.—A fair volume of business is being placed in Universal Plates, but the local demand still continues light for Sheared Plates. The orders for the latter are confined to an occasional boiler specification or small lots for repair work. Prices are firm, as follows, for tidewater delivery: Sheared Tank Plates, 1.74½¢ to 1.84½¢; Flange Plates, 1.84½¢ to 1.94½¢; Marine Plates, 2.14½¢ to 2.24½¢; Fire Box Plates, 2.24½¢ to 2.60¢, according to specifications.

Cast Iron Pipe.—Inquiries keep up remarkably, considering the enormous quantity of work which has already been booked by the foundries. Numerous orders are being placed, although deliveries may not be made for several months hence. Carload lots of 6-in. pipe continue to be nominally quoted at \$31 to \$32, but early delivery is out of the question.

Old Material.—Everything in the line of Cast Scrap is scarce. The demand for Heavy Cast is as great as has ever been known, even railroad companies being in the market for supplies for their own foundries. Cast Borings are also in active demand. Indications are now strongly in favor of higher prices for Steel Scrap. Not only are inquiries for good quantities being received, but offers have been made of \$16 delivered in eastern Pennsylvania without securing the material. It is believed that a considerable short interest exists which is trying to cover. Bids on railroad lists now coming out are considerably higher than for some time. Rolling mill stock can be sold to some extent, as the mills now running are taking in a fair supply of material. Taking all conditions into consideration the belief in trade circles is strong that prices have seen their low point for the summer. Quotations for New York and vicinity are about as follows:

Old Iron Rails.....	\$19.50 to \$20.50
Relaying Rails.....	25.50 to 26.00
Old Steel Rails, rerolling lengths.....	16.00 to 16.50
Old Steel Rails, short pieces.....	14.50 to 15.00
Heavy Melting Steel Scrap.....	14.50 to 15.00
Standard Hammered Iron Car Axles.....	24.50 to 25.00
Old Steel Car Axles.....	18.50 to 19.50
No. 1 Railroad Wrought.....	17.00 to 17.50
Iron Track Scrap.....	15.50 to 16.50
No. 1 Yard Wrought, long.....	16.00 to 16.50
No. 1 Yard Wrought, short.....	14.00 to 15.00
Wrought Pipe.....	12.25 to 12.75
Light Iron.....	9.50 to 10.00
Cast Borings.....	8.50 to 9.00
Wrought Turnings.....	11.00 to 11.50
Old Car Wheels.....	16.50 to 17.50
No. 1 Machinery Cast.....	15.50 to 16.00
Stove Plate.....	10.50 to 11.00
Grate Bars.....	9.50 to 10.00
Malleable Cast.....	15.25 to 15.75

The British Consul in the Oruro district of Bolivia reports good progress there in the development of tin mining. It is stated that the older enterprises have been supplying themselves with improved machinery, while new and promising mines are being opened up, though the scarcity of capital as yet hinders development. The most productive tin lodes outcrop at considerable elevations above the neighboring water courses. The consul says that one of the great difficulties in mining on the Bolivian table land is the want of cheap motive power. Permanent water power is not generally available to any extent; coal is too expensive and the native fuels are getting scarce. A solution appears to have been found to some extent in the employment of anthracite gas engines.

Metal Market.

NEW YORK, July 18, 1906.

Pig Tin.—Slight advances in price have been made daily on exceedingly small business. It has been said that if 100 tons were sold during the week it was a large amount. The usual trade is about that much each day. On Thursday the market was a little higher at 36.15¢ to 36.20¢. Friday sales were made at 36.45¢, and Monday the highest price for the week was reached at 36.85¢. Tuesday there was a decline to 36.55¢, and to-day further concessions are being made, Tin being obtainable at 36.25¢. The arrivals have been fair, amounting to 2278 tons, and there are afloat for American ports 1607 tons. It is thought that the dullness will continue until after the next Banca sale, which takes place in Holland July 25. At present there is little or no Tin going out of store. The London market closes easy at £16 12s. 6d. for spot and £16 10s. for futures.

Copper.—The little business transacted during the week was done at materially lower prices. The larger consumers have contracts covering their requirements for some months, but smaller melters are buying only as they are compelled to and are running along on very limited stocks. In Europe the same disposition to await developments is noted. The volume of trade in Lake was so small that it is difficult to establish a range of quotations. There is no doubt, however, that nearly all brands can be obtained at 18.37½¢ to 18.62½¢. There are offerings of Electrolytic at 18.12½¢ to 18.37½¢, and it is believed that a firm offer at 18¢ or thereabouts would be accepted. The largest seller of Electrolytic, having little metal for sale this side of October, continues to quote 18.50¢, delivered 30 days. Another large company is reported to be an anxious seller at 18.25¢, delivered 30 days. Casting grades can be obtained at 17.87½¢ to 18.12½¢. Sales of Electrolytic have been made in Europe this week equivalent to 18¢, New York. The London market closes to-day as follows: £80 7s. 6d. for spot, £79 17s. 6d. for futures and £84 10s. for Best Selected. The exports so far this month aggregate 9039 tons.

Pig Lead.—The offerings of foreign Lead which have been made during the past fortnight have broken the price of domestic to 5.75¢ for spot deliveries, New York. Foreign Lead for shipment can be had at 5.65¢ to 5.70¢. This foreign Lead shows a loss of 25 to 30 points to the holders, as import cost was approximately 6¢. The principal producer continues to quote shipment Lead in 50-ton lots at 5.75¢. Lead in St. Louis is also easy at 5.70¢. Business is extremely dull, there being little or no demand. In London the market is a trifle firmer at £16 12s. 6d.

Spelter.—Transactions during the week have been of the routine order, but the market is steady and perhaps a trifle firmer, spot being quoted at 5.95¢ to 6¢ in New York, and 5.85¢ to 5.87½¢ in St. Louis. In London Spelter is easier at £26 15s.

Antimony.—The heavy supplies which have been dumped on this market and the high carrying prices are responsible for holders offering the metal at slight concessions below London parity. Cookson's and Hallett's are offered at 22½¢; other grades at 21¢ to 22¢. The large stocks and the disposition of holders to close out their commitments lead to the conclusion that probably a firm offer at lower prices would be accepted.

Aluminum.—The principal producer of the metal advanced prices 1¢ per lb. July 9, No. 1 Ingots now being held at 36¢, and No. 2 Ingots, over 90 per cent. pure, at 34¢. This follows an advance of 2¢ per lb. made last December, which was the first change in price that had been made in a number of years.

Nickel.—Prices are unchanged at 45¢ to 50¢ for large lots; 50¢ to 60¢ for smaller quantities.

Tin Plates.—Business is extremely dull, especially so for Terne Plates. There is a little better demand ruling for Coke Plates, but most of the large consumers entered their orders when prices were 15¢ to 25¢ a box lower. Prices are unchanged at \$3.94, f.o.b. New York, and \$3.75, f.o.b. Pittsburgh, subject to the usual trade discounts. In Swansea prices are 1½d. lower at 12s. 7½d.

Old Metals.—An error was made in last week's issue in the use of the word "buying" instead of the intended word "selling." Quotations on Old Metals appearing in this market always represent selling prices. There has been so little business that all quotations are largely nominal. On a firm offer the following dealers' selling prices might be shaded:

	Cents.
Copper, Heavy Cut and Crucible.....	17.75 to 17.87½
Copper, Heavy and Wire.....	17.50 to 17.75
Copper, Light and Bottoms.....	15.75 to 16.00
Brass, Heavy.....	12.00 to 12.25
Brass, Light.....	9.75 to 10.00
Heavy Machinery Composition.....	15.75 to 16.00
Clean Brass Turnings.....	11.00 to 11.25
Composition Turnings.....	13.50 to 13.75
Aluminum Scrap.....	26.00 to 28.00
Lead, Heavy.....	5.25 to 5.40
Tea Lead.....	5.10 to 5.25
Zinc Scrap.....	4.40 to 4.60

Iron and Industrial Stocks.

NEW YORK, July 18, 1906.

The liquidation in the stock market, which has for some time been quite a feature, was less perceptible during the past week. Values, in fact, showed a strong tendency to advance. In some instances, particularly in the case of Locomotive common, quite a heavy gain was made. The range of prices on active stocks from Thursday of last week to Tuesday of the present week has been as follows: Car & Foundry common $32\frac{3}{4}$ to $35\frac{1}{4}$; Locomotive common $62\frac{1}{2}$ to $69\frac{1}{4}$; Steel Foundries preferred $40\frac{3}{4}$ to 42; Colorado Fuel $44\frac{1}{2}$ to $48\frac{1}{2}$; Pressed Steel common 43 to $45\frac{1}{2}$; Railway Spring common $46\frac{1}{2}$ to $49\frac{3}{4}$; Republic common 24 to 26, preferred $92\frac{1}{2}$ to 95; Sloss-Sheffield common $68\frac{1}{2}$ to 71; Tennessee Coal $141\frac{1}{4}$ to 144; Cast Iron Pipe common $44\frac{3}{4}$ to $46\frac{1}{2}$; United States common $32\frac{5}{8}$ to 35, preferred $99\frac{1}{2}$ to $102\frac{1}{4}$. Last transactions in active stocks up to 1.30 p.m. to-day are reported at the following prices, which are in most cases slightly under those prevailing Tuesday: Can common $6\frac{1}{2}$, preferred $53\frac{1}{2}$; Car & Foundry common $34\frac{1}{2}$, preferred $99\frac{1}{2}$; Locomotive common 69, preferred 116; Steel Foundries common $10\frac{1}{2}$, preferred 42; Colorado Fuel $47\frac{3}{4}$; Pressed Steel common $45\frac{1}{4}$, preferred 96; Railway Spring common 49; Republic common $25\frac{1}{2}$, preferred 95; Sloss-Sheffield common 70; Tennessee Coal 144; Cast Iron Pipe common $46\frac{1}{2}$, preferred $91\frac{1}{8}$; United States Steel common $34\frac{1}{4}$, preferred 101.

It is stated that the plan for the consolidation of the National Steel & Wire Company and its subsidiaries with possibly other corporations under the title of the National Consolidated Wire & Cable Company, incorporated in Maine with \$16,000,000 authorized capital stock, will probably be announced within a few weeks. A circular has been issued in England regarding the matter. Pending the completion of the merger the cumulative dividends on the preferred stock of the National Steel & Wire Company have been declared, but remain unpaid. A bond issue, it is understood, is contemplated.

The Allis-Chalmers Company.—At a meeting of the stockholders of the Allis-Chalmers Company, held in New York on July 16, the plan for the proposed \$15,000,000 bond issue was ratified by a close vote. The needed number of affirmative shares of preferred stock was 121,125; the number voted in favor of the bond issue was 123,000. Of the total amount of bonds \$12,000,000 will be offered the stockholders at 80. The remainder will be held in the treasury. The statement issued under date of June 30 says: "When the (first) \$12,000,000 bonds shall have been sold, the net working capital, being the quick assets available after providing for all current liabilities to the public, will exceed \$10,000,000. The bonds will be a first mortgage upon our real estate and manufacturing plants, including new productive property acquired. The cost of the new property, together with the additions now being erected at West Allis, amounts to \$10,528,914. During the past five years \$4,249,000 has been charged off in the expense accounts for depreciation, maintenance and repairs. Of the expenditures for patents, experiments, special tools, drawings, &c., in the development of improved products, more than \$500,000 has been charged off as current expense." Concerning the business of the company, President Whiteside said that in the past year the sales of the electrical department exceeded those of the previous year by more than 100 per cent. In process of construction and installation is the following machinery: 24 steam turbine units, aggregating 45,000 hp. capacity; 12 gas engines, aggregating 30,500 hp., connected to electric generators or to blowing engines; 43 hydraulic turbines, aggregating 165,680 hp., to develop water powers in 12 of the States, Canada and Mexico; 52 blowing engines, weighing about 14,000 tons, for steel manufacturers; plant equipments for numerous mining companies, cement manufacturers, lumbermen, flour millers and water works companies; also engines and electrical equipment for a number of traction lines.

Dividends.—The National Steel & Wire Company has declared the regular quarterly dividend of $1\frac{1}{4}$ per cent. on the preferred stock.

The International Steam Pump Company has declared the regular quarterly dividend of $1\frac{1}{2}$ per cent. on the preferred stock, payable August 1.

The By-Products Coke Corporation, Chicago, will erect 40 additional ovens at its South Chicago plant. A battery of 120 was recently completed, but owing to the heavy demand for this material an increased output is required and the additional ovens will be run to completion as speedily as possible.

A meeting of the Administrative Council of the National Founders' Association will be held at Detroit July 25 and 26.

San Francisco Clearings Hold Up Well.

SAN FRANCISCO, July 10, 1906.—It will be many a day before San Francisco assumes its old appearance, but the ruins are fast being covered by a temporary city, which, like the San Francisco of the early fifties, is constructed almost altogether of lumber. Here and there a corrugated iron store makes its appearance, but these are few and far apart. The number of new buildings put up since the fire now exceeds 1000, including those already occupied or which will be occupied by July 15. While these are scattered all over the burned area, they may be divided into three principal groups—those on Fillmore street, those on Van Ness avenue, and those on the city front and south of Market. Less progress is being made north of Market, partly because a portion of the burned section there belonged to the residence district, partly because the buildings in the business part are of brick or steel or stone, so that there is more debris to be carried away, and partly because a great many of the buildings simply need renovation, the walls standing as firm as before the earthquake.

Among the groups of buildings that are wholly or partly restored and reoccupied are the Call Building, the Mutual Savings Bank Building, the Union Trust Company's Building, the Crocker Building, the Merchants' Exchange, the Kohl Building and the New York Mutual Building. The old '49 Building on the corner of Montgomery and California streets is now the headquarters of the Savings Union. Most of the other banks are housed in structures erected inside the old walls, or such portions of the walls as remain standing. Every week sees a new street car line running.

The principal troubles facing the citizens now are the unsettled conditions of insurance matters and the strike and tie-up on the water front. Many millions of money have been paid out to policy holders, but this is only a drop in the bucket; and it is feared that it will be some time before this question is settled satisfactorily. The commercial bodies, the Chamber of Commerce, Produce Exchange and others have organized a society of policy holders, whose claims aggregate from \$100,000,000 to \$150,000,000. If the insurance companies would only say definitely what they can do, then some course of action could be adopted.

The tie-up has cut down the export trade of San Francisco seriously. The last two Panama steamers did not carry a pound of freight. A good deal of lumber has been coming along despite the trouble.

Despite all, the transactions of the Clearing House keep up. A recent total was \$30,545,176, against \$30,999,862 in the corresponding week of 1905. This is not bad for a burned city. The distribution of merchandise in the fall will be fully equal to that of last year and may be greater, as the wheat and barley crops are better than they have been in a great many years, and the demand generally will be greater for merchandise of all descriptions. There is a large inquiry for seasonable agricultural implements, while for the rebuilding of the burned city there is practically no end to the demand for nails and building hardware. The destruction of the sheet iron pipe establishments will send a large trade to the factories of the East. The supplies for oil wells and for the lumber mills will make a big draft on the Eastern establishments that deal in these supplies.

It will be some time before the great hardware houses will have been established in or near their old headquarters. They were all burned out except the Pacific Steel & Hardware Company. Baker & Hamilton are still down on Berry street, and the Dunham, Corrigan & Hayden Company is on Kansas street. W. W. Montague & Co. have begun to stock up a one-story establishment built of wood and corrugated iron on the corner of Church and Polk streets. It takes up nearly half a block on Turk street. Holbrook, Merrill & Stetson have not yet returned from Oakland and are still carrying on their business there. The greed of some owners of land is an obstacle to settling down in the old positions on or south of Market street and near the water front, but all will come right in due time.

J. O. L.

Indiana Steel Company Awards.

Contracts for six charging machines for the two open hearth plants of the Indiana Steel Company, Gary, Ind., have been awarded to the Wellman-Seaver-Morgan Company, Cleveland, Ohio, and awards for the rail mill proper will be made in a few days. Plans for the rail mill building will then be prepared and specifications for the structure will be given to the American Bridge Company. The plans for the erection of four merchant mills, one plate mill and two billet mills will be prepared as soon as the machinery contracts are awarded for the rail mill. The erection of these finishing mills was a matter for future consideration, but on account of the pressure on all Steel Corporation mills for finished material it has been decided to proceed with their construction at once. One billet mill will be designed to roll small sections up to 1½ in. and the other will roll up to 4 x 4 in. The nature of the plate mill has not yet been decided upon, but the merchant mills will be arranged in sizes from 8 to 20 in. diameter of rolls. The Great Lakes Dredge & Dock Company, Chicago, has been awarded the contract for the construction of the harbor at Gary, which will cost \$1,500,000. The work includes 2,000,000 cu. ft. of dredging, 10,000 lin. ft. of timber dock and breakwater, 3000 lin. ft. of concrete dock and a concrete water intake with two 10-ft. tunnels to connect with the shore.

The Awards on Coke and Pig Iron for Panama.

WASHINGTON, D. C., July 17, 1906.—The Isthmian Canal Commission awarded the contract to-day for 200,000 pounds of No. 1 foundry pig iron and 400,000 pounds of No. 2 foundry pig iron for delivery at Colon on the Isthmus of Panama. The successful bidder was Woodward, Wright & Co., New Orleans, whose price was \$5520 for the 600,000 pounds of iron delivered. The bid of Motley, Green & Co., New York, \$5180, was the lowest, but being for foreign iron it was thrown out. Woodward, Wright & Co. and other bidders ignored the peculiar specifications of the Government, and merely bid on No. 1 and No. 2 iron, as so designated in the trade.

The contract of 600,000 pounds of coke for Panama Canal work was awarded to the Pocahontas Coke Company, subject to the approval of the Canal Commission's New York agent, E. A. Drake, who is to investigate the cost of transporting the coke from Lambert's Point to Colon. The Pocahontas Coke Company bid \$1320 for the coke delivered at Lambert's Point and \$2520 delivered at Colon.

Large Allis-Chalmers Contracts.—The Illinois Steel Company, Chicago, has awarded a contract to the Allis-Chalmers Company, Milwaukee, for four 42 x 54 in. horizontal four-cylinder double acting twin tandem gas engines, directly connected to four 2000-kw. alternating current Bullock generators. These engines and generators will be installed at the South Works to provide increased power for the new plate and light rail mills that will be added to this plant. For installation at the Bay View Works, Milwaukee, where extensive improvements are under way, a contract has been awarded the Allis-Chalmers Company for one 500-kw. gas engine generating plant. Other contracts secured by the Allis-Chalmers Company include four horizontal twin tandem gas blowing engines, 3000 b.h.p. each, and one horizontal tandem gas engine generating unit for installation at the Homestead Works of the Carnegie Steel Company, Pittsburgh; one 1500-kw. horizontal twin tandem gas engine generating unit for installation at the McKeesport Works of the National Tube Company, and one steeple type vertical cross-compound blowing engine by the Jones & Laughlin Steel Company, Pittsburgh.

The Interstate Iron & Steel Company, Chicago, has purchased a tract of 21½ acres adjoining its plant at East Chicago, Ind., to be utilized for future extensions. A new shipping dock and storage yard will be immediate-

ly erected with tracks paralleling the mill buildings instead of running at right angles to them, as at present, and the shipment of material will thereby be materially increased.

New Publications.

Statistics of the American and Foreign Trades for 1905: The Annual Statistical Report of the American Iron and Steel Association. By James M. Swank, general manager. Pages, 93. Price, postpaid, \$5. or 21s. Published by the American Iron and Steel Association, 261 South Fourth street, Philadelphia, Pa.

The annual statistical volume of the American Iron and Steel Association is unique in the statistical literature of iron and steel, and the report before us fully sustains the high standard the association's office has set. Completeness and accuracy have always characterized the work, and the American iron trade has reason for congratulation that it has been so ably served in this respect. In addition to the usual detail with which statistics of production of raw materials and all classes of iron and steel products are presented in these annual reports, that for 1905 has some new features, including the separation of plates from sheets. There is also unusual fullness in the statistics of the iron and steel industries of Great Britain, Germany, France, Belgium, Spain, Italy, Austria, Hungary, Russia and Sweden for 1905 and 1904.

Types and Details of Bridge Construction. Part II, Plate Girders. By Frank W. Skinner. Published by the McGraw Publishing Company, 114 Liberty street, New York City. Size, 6 x 9 in.; xii + 412 pages; profusely illustrated. Price, \$4.

One of the first impressions received from an examination of this volume is that the author and publisher are firm believers in the value of precedents as a guide to designers, for the book is largely made up of illustrated descriptions of typical and conspicuous examples of plate girder work. In this respect it is a symposium of the ideas of a large number of designers of successful structures rather than the opinions of a single engineer, for the author emphasizes the fact that the details are presented without criticism and that while any particular one is not indorsed it is considered typical or interesting as an example of actual construction. Conciseness is a feature of the treatment, compelled by the large number of structures analyzed, and as a result the text has to be carefully weighed in the reading not to lose its full import. Besides the general matter of the book methods of calculation are reviewed, the essential requirements of specifications are noted, systems of making and preserving drawings and records are explained, erection methods are described, data of full size practical tests are given and by a strikingly pleasing and consistent arrangement the volume concludes with a series of signed monographs by eminent engineers on features of plate girder construction and their computation and design. An outline more in detail of the make up of the book is as follows:

Both railroad and highway bridges are discussed. The railroad bridges include straight and skewed girders for one to four track bridges, with especial reference to structures of 80 to 128 ft. span. Multiple spans supported on towers are grouped separately and include approaches, track elevations and famous viaducts. Variations in important details are shown to relatively large scale, classified and arranged to allow of comparison and grouping of similar details together. Long span highway girders, including aqueducts and cantilevers, are arranged with miscellaneous and curious girders. The book is not intended as a text book, but as an adjunct to books devoted to the demonstration of the analytical and graphical methods of determining stresses and proportions, and as an assistant to the practical man, although it serves, as stated, to outline what is involved in design. It is a companion volume to one on arches recently published by the author.

Trade Publications.

Air and Gas Compressors.—Ingersoll-Rand Company, 11 Broadway, New York City. Catalogue No. 37. Size, 6 x 9 inches; pages, 120. Devoted to Rand air and gas compressors. They are built in six standard types as well as several special types. The standard types include the classes RB, RB-D, RC, RD, Imperial type X and Imperial Type XI. Numerous combinations may be had, including duplex and single cylinder patterns, steam or belt driven, with Corliss or Meyer steam valves, and the duplex patterns can be fitted with either or both ends cross compounded. Among the special types of compressors are water wheel compressors; sectional compressors; gas compressors, vertical and straight line; high pressure compressors, vertical and straight line; electrically driven compressors, and gas, gasoline and oil engine driven compressors. The catalogue is very complete in its treatment of the details of the machines. A particularly interesting part is that referring to the various types of steam and air valves, and the method of governing and regulating. With each of the different types of compressors specification tables are given of the dimensions and capacities and other useful information. Included also is a considerable amount of general information of interest to those dealing with compressed air. At the latter part of the catalogue space is given to air receivers and pressure tanks, air reheaters, high pressure compressors, &c.

Concrete Reinforcement.—Expanded Metal & Corrugated Bar Company, 925 Frisco Building, St. Louis. Catalogue. Size, 5 x 7 in.; pages, 232. Deals particularly with corrugated bars for reinforcing concrete. The introduction treats interestingly of the theories and laws as at present understood to govern the performance of reinforced concrete, and the latest conclusions as to what constitutes good practice. Engravings follow showing the various sizes and forms of corrugated bars rolled, giving their net section and weight per foot. The body of the book is largely illustrated matter consisting of details showing various systems of reinforcing for different parts and types of structures, and many half-tone engravings illustrate work in process of erection and after completed. Walls and floors of buildings, bridges, footings for columns and miscellaneous structures are so shown.

Horizontal Engines.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Bulletin 131. Describes in detail the Sturtevant horizontal engine, class HCl, which is built in sizes ranging from 6 x 8 in. to 18 x 16 in., and ranging in capacity from 11 to 235 h.p.

Track Drills.—Cook's Railway Appliance Company, Kalamazoo, Mich. Booklet. Contains illustrations and descriptions of track drills and track tool grinders. The drills include the Cook Premier track drill with variable and reversible feed, and the Standard track drills and Cook's Standard tool grinder. A considerable amount of text is given to explaining the construction and operation of the tools, and a price-list of repair parts is appended.

Alloys.—Geo. G. Blackwell Sons & Co., Limited, the Albany, Liverpool, England. Pamphlet No. 3. Gives full particulars concerning the Lion brand alloys, metals and steel makers' specialties, particularly referring to alloys produced by the electric furnace.

Pump Valves.—Crosby Steam Gage & Valve Company, 16 Dey street, New York. Circular. Refers to the Branden patent pump valve with wire coil insertion, claimed to stand more than double the pressure of ordinary flexible valves.

Small Motors.—Stanley-G. I. Electric Mfg. Company, Pittsfield, Mass. Bulletin No. 605, superseding No. 464. Deals with small direct current motors of the bipolar type operating at moderate and slow speeds and ranging in capacity from 1-16 to 2 h.p.

Metal Saws.—J. Beardshaw & Sons, Limited, Baltic Steel Works, Sheffield, England. Price-list. Lists the Conqueror saws for cutting hot and cold metals. The manufacture of these saws is a special line engaged in by this company, which has made saws varying from 2 in. to 9 ft. 10½ in. in diameter and from 1-32 to 1½ in. thick.

Belt Lacing.—The Bristol Company, Waterbury, Conn. Bulletin No. 39. Contains a price-list of Bristol steel belt lacing, which includes several new sizes recently added to the line manufactured. The circular gives information in tabular form enabling one to see at a glance the relation which exists between the different styles and sizes.

Wire Rope Tramways.—The Trenton Iron Company, Trenton, N. J. Circular. Relates to the Bleichert system of wire rope tramways, illustrating parts in an equipment and typical installations, with explanatory text outlining the adaptability of the system to various conditions.

Controllers.—Electric Controller & Supply Company, Cleveland, Ohio. Two loose leaf bulletins. No. 101 is devoted to Dinkey ventilated controllers, and No. 102 to type U controllers. Each is very systematically arranged, beginning on the first page with instructions for ordering, stating what specifications are required. This is followed by illustrations of the various types and very complete description covering the details of con-

struction, followed by tables of resistance for various voltages, wiring diagrams and price-lists of the controllers and their parts.

Motors and Generators.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 64. Refers to the form I motors and generators, the motors being made in sizes from 3 to 45 h.p. and the generators from 2½ to 40 kw. sizes. The machine is one particularly intended for the driving of machinery, especially machine tools and has recently been somewhat modified in the form of its frame so that it has all the advantages of the open type motor and yet can be fully inclosed if conditions require.

Pyrometers.—Charles Engelhard, 41 Cortlandt street, New York. Catalogue of Le Chatelier's pyrometer for measuring temperatures between zero and 2920 degrees F. The pyrometer is constructed according to the direction of the Royal Physical Technical Institute, Charlottenburg, near Berlin, by the W. C. Heraeus Platinum Works, Hanau, Germany. A description of the instrument is followed by useful information concerning temperature determinations common in the arts, such as the fusing of certain metals; temperatures in steel converters, open hearth furnaces, blast furnaces, &c.; temper colors of steel, melting points of solders, fusible alloys, &c. This is followed by several testimonial letters from users of the apparatus in this country. Inclosed circulars deal with electrically heated laboratory furnaces for high temperatures, and apparatus made of melted rock crystal for chemical purposes, including test tubes, flasks, beakers, &c.

Electrical Apparatus.—General Electric Company, Schenectady, N. Y. Catalogue, flyers, &c. Publication No. 1052 deals with lightning arresters, their dimensions and connections, and instructions for installing are in a supplement to the catalogue. Flyer No. 7596 deals with Sprague-General Electric type M control apparatus. Supply catalogue 7597, superseding No. 7584, is especially concerned with marine supplies. Flyer No. 2175 refers to type SC speed controlling rheostats with no-voltage and overload release for use with shunt or compound wound motors; No. 2178, to key and keyless receptacles, National Electrical Code standard; No. 2179, to all porcelain wireless clusters; No. 2180, to porcelain sockets, National Electrical Code standard; No. 2181, to receptacles for outdoor wiring; No. 2182, to type MA13A copper ribbon fuse box; No. 2183, to type MS 8 hood switch for railroad service, and No. 2184, to type T, form D and form D-2 fuse holders.

Corliss Engines.—Murray Iron Works, Burlington, Iowa. Catalogue No. 56. Size, 9 x 12 in.; pages, 72. Mainly devoted to the Murray Corliss engines, which are built in numerous patterns, including plain and box girder frames, tange frames and rolling mill type frames. The latter are particularly designed for high pressures and high speed, and contain a number of improvements which were described in *The Iron Age* August 11, 1904. The second half of the catalogue deals with Murray tandem and cross compound Corliss engines, the Murray automatic engine stop, Murray air compressors, two-stage compound Corliss air compressors, high duty pumping engines, vertical piston valve engines, high pressure Murray fire tube and water tube boilers, and Murray closed and open feed water heaters and purifiers. The company is prepared to furnish the equipment for complete power plants, and gives an example of a typical installation.

Pipe Coverings and Asbestos Roofing.—H. W. Johns-Manville Company, 100 William street, New York. Circulars. One refers to pipe covering for high pressure and superheated steam plants, including asbestos-sponge, felted, "J-M" 85 per cent. magnesia, and asbestos fire felt. A second circular deals exclusively with asbestos fire felt covering. A third gives tests and practical data, showing the economy in transmitting steam by the Portland sectional conduit system, and a leaflet contains a letter describing the remarkable length of life of a Kearsarge asbestos metallic gasket. Another circular concerns Asbestocel covering for heating systems, particularly intended for the insulating of pipes and boilers for low pressure steam, hot water and hot air systems. Two other circulars pertain to roofing and explain the advantages and economies of "J-M" asbestos roofing. One is entitled "A Good Roofing Proposition," and the other "Roofing Reasonings as Applied to 'J-M' Asbestos Roofing." A third circular concerns Keystone hair insulator, which is described as an ideal sheathing for all kinds of buildings to make them warm in winter and cool in summer. The material is also useful as a sound deadener.

Mechanical Firing.—Ross Engineering Company, 1 Madison avenue, New York City. Booklet. Covers the foregoing subject in general and the Ross mechanical stokers in particular. Assuming it granted that firing by mechanical stokers is superior to firing by hand, this publication sets forth points which should be taken into account in selecting a stoker. This is followed by exterior and sectional views of the Ross mechanical stoker and a description of it in detail.

Steam Engines.—Donegan & Swift, 6 Murray street, New York City. A 10 x 13 in. pamphlet. Contains a description of Swift's high speed self-oiling inclosed frame automatic cut-off steam engine. Following an enumeration of its special features are views showing the engine alone and as applied to the driving of a direct connected generator, and also longitudinal sectional plan and elevation.

The Machinery Trade.

NEW YORK, July 18, 1906.

Thus far this summer there has been no noticeable decrease in either orders or inquiries, the business being practically a continuance of the heavy spring trade. Machine tool builders and dealers report a very strong demand for all classes of tools, and are constantly seeking some way to remedy the trouble of delivery, which is probably the hardest problem before the machinery houses to-day. Some of them are booked so far ahead that a few weeks' lull in the market would be very acceptable, provided they were sure that the fall would see a resumption of the heavy buying. The inability to secure machines for near delivery has caused a scramble for any good second-hand tools. Consequently the announcement of the sale next week of the Shaw Machine Company's equipment has caused considerable interest in the trade. Many of the houses who have received catalogues intend to send representatives to secure what machines they can. During the week the Pennsylvania Railroad placed some good-sized orders, but the other railroads which have lists out made no substantial purchases. It is understood that the New York Central will not issue its large list of specifications until the middle or latter part of August. From reports it is evident that the steel car industry is on the increase, especially steel cars for passenger service. We are informed that one company receives inquiries daily from steam roads which intend to supersede their present passenger equipment with steel cars.

The fact that an unusual number of large power orders have been placed during the last month and that there are a number of others about to be awarded gives indication that the machine tool trade will be good for the next few months, as it generally follows that a buying movement in the big engine line is followed by the placing of orders for smaller equipment. This is considered so generally true by the trade that those who sell machine tools invariably follow up those who have placed orders for power machinery with the expectation of landing some business. We are in a position to know that a number of those who have given orders of late for heavy machinery in the power line will soon be in the market for machine tools, and the general indications are that all branches of the trade will find few dull weeks during the summer. Thus far there have been no dull times in the trade, and the scarcity of information regarding new propositions is more than made up by the many pending projects coming along that have been held up because their promoters have known that they would be unable to get good deliveries. The better terms that the engine men have been able to give of late have borne fruit in the way of orders, and this will undoubtedly be true in the other lines as soon as fair deliveries can be made.

The prediction made in these columns several weeks ago, to the effect that manufacturers of ice machinery would be especially busy this summer, has been borne out by the present conditions in the trade. A prominent concern which formerly manufactured one or two lines of ice machinery but gave it up, has put its old patterns into use again, with the result that it has been overwhelmed with business. With those who make a specialty of making ice manufacturing machinery business is rushing and they practically have more than they can attend to. The scarcity of ice this summer has also awakened ice manufacturers to the possibilities in their line, and some of them are already placing orders for equipment that they do not expect to be able to use for another season.

In line with the effort now being made throughout the country to organize local associations in the machinery trade H. T. Anderson, secretary-treasurer of the National Supply and Machinery Dealers' Association, is sending out a series of circular letters to the supply and machinery dealers, giving reasons why they should become affiliated with the National Association. In addition to the great advantage of being properly organized and informed concerning all conditions affecting the trade of the entire country and thereby being in the best position to withstand a business depression, Mr. Anderson gives many other reasons why it is to the best interests of the dealer to belong to the association. Stress is laid upon the necessity of unifying and harmonizing the various interests, so that by co-operation the evils that make business more difficult can be eliminated and profits sustained. The ideal condition in business is one in which everybody makes a fair profit, but competition between sellers who never confer with one another has too often placed important lines of trade on perilously low margins.

Missouri, Kansas & Texas Requirements.

The Missouri, Kansas & Texas Railroad has begun work on an extensive plant at Parsons, Kan., which will include large locomotive shops, blacksmith shops, general repair works and the like, and orders are already being placed for the power house equipment. As stated in these columns before, G. R. Henderson, of 20 West Thirty-fourth street, is the consulting engineer, and he has of late been placing orders for the power equipment, which will include about 2000 hp. of boilers and six engines and generators, making a total of about 11,000 kw. There will also be an air compressor capable of taking care of about 3000 cu. ft., and two 1000-gal. pumps. The order for the engines has been awarded to E. R. Ludeman & Co., 42 Broadway, and the other equipment will be arranged for very shortly. The locomotive shops to be built by the company will be about 154 x 860 ft. There will be a smith shop, 101 x 252 ft., and another building 60 x 150 ft., which will probably be used for a car house and offices, and the power house, 83 x 215 ft. The company has had the construction of the plant under consideration for some time, but for various reasons the project was held up. It is the purpose now to go ahead with it, and it will probably be completed within a year. Orders for the general machinery equipment, including the machine tool outfit, have not been placed as yet, and they will probably be arranged for by the company's mechanical engineer through its purchasing agent. While the list has not appeared as yet, it is in course of preparation, and it will not be long before the trade will be given a chance to bid on a considerable quantity of machinery.

It is understood that the Intercolonial Railroad has started the construction of its new shops at Moncton, N. B. Plans for the complete buildings have not yet been finished, and it is understood that only one building is to be built at this time.

The Schenectady Railway Company, Schenectady, N. Y., has selected a site 250 x 500 ft. for its proposed machine and repair shops, which will probably be erected in the fall. The construction of these new buildings, which will consist of a main shop, 150 x 200 ft., carpenter shop, paint shop and other buildings, will cost in the neighborhood of \$150,000. The Board of Directors has not yet made an appropriation for the buildings, and nothing has been done toward actual letting of contracts for building and equipment.

It is reported that the Pennsylvania Railroad has obtained control of the McCall's Ferry Power Company, which is harnessing the falls of the Susquehanna River at McCall's Ferry and Conowingo, Md., to generate electricity. This power will probably be used to operate most of the Pennsylvania Railroad trains south of Philadelphia on the Delaware and Maryland Division, and it is estimated that the development of the power and the equipment of this new electric zone will cost about \$20,000,000.

New Industrial Plants.

Feeling the necessity for a larger plant and the facilities for enlarging its business Anne & Thomas and the Thomas A. Anderson Machine Company, both of Lancaster, Pa., were consolidated some time ago under the name of the Lancaster Machine & Structural Works, with a capital stock of \$350,000. This new company purchased a 4-acre site in North Lancaster, and has broken ground for the erection of a new plant between the Pennsylvania and the Philadelphia & Reading railroads. The company has not yet purchased the equipment for the new plant, and will require a cupola and other machinery for the foundry, 100 hp. Corliss engine and boiler and the necessary machinery for the structural shape, machine shop and pattern shop, including cranes, trolleys, lifts, &c. The new plant will have switches connecting with both the railroads, giving it excellent shipping facilities. The foundry will be 60 x 160 ft., one story. The structural shop will be 70 x 160 ft., one story, and will be built of cement blocks, as will all the other buildings. Opposite the structural shop will be the machine shop, a three-story structure with a three-story engine room adjoining, 40 x 50 ft., and a boiler room, 30 x 40 ft. one story. Adjoining the other end of the machine shop will be the smith shop, 40 x 50 ft., and nearby will be erected a fireproof pattern shop, 40 x 50 ft. All of the officers are practical men, and each will superintend the department in which class of work he has had long experience. George W. Anne, Sr., is president, F. H. Knight vice-president and general manager, and J. W. Anne treasurer. The company will do all kinds of structural steel and iron work, general foundry and machine work, and will manufacture the Thomas A. Anderson gasoline engine.

A good deal of work has lately been taken on by W. S. Barstow & Co., New York, in the way of remodeling and enlarging plants, placing them in the best position to turn out the work required. To carry out the improvements the firm buys a great deal of both power and machinery equipment. It has just been appointed engineers for the New Jersey Company, Matawan, N. J., which is making improvements and additions to its plant. The remodeled plant will have double the capacity of the old one. In order to

meet the increased shipping requirements a large dock will be built on Matawan creek, and a new power house will provide for electric drive and lighting throughout the plant. None of the equipment for these additions has been purchased. The requirement include brick machinery, engines, generators, electric lighting plant, fan, coal handling machinery, conveying machinery, industrial railway, structural material, &c.

The Raritan Copper Works, at Perth Amboy, N. J., has been making purchases of late for the shops now being built, and nearly all of the inquiries have been placed in the New York market. The company is about doubling the size of its plant, which is already an extensive electrolytic copper refinery, and when completed it will be one of the largest of its kind in the country. The large power men in New York are in receipt of specifications for a considerable outfit, including four 871 kw. cross compound engines, two 175 kw. tandem compound engines, two 75 kw. tandem compound engines and one 250 kw. tandem compound engine. The crane outfit has been about closed out, and the Case Mfg. Company has been awarded the contract for a 15-ton 47 ft. 5 in. span motor traveling crane of the 1906 model, and it is understood that the other equipment along that line has been practically arranged for. D. G. Nevill, who is at the works at Perth Amboy, has been doing most of the buying, although George K. Fisher, of 17 Battery place, New York, who is consulting engineer for the company, has, in a measure, passed on the purchases. The general machinery outfit for the plant has not been bought as yet, it is understood, and from all accounts there are still a good number of orders to be placed. In fact, there are some inquiries in the market with specifications attached that have not been settled upon.

The Chrome Steel Works, Chrome, N. J., which is closely connected with the Raritan Copper Works interests, is also making some additions to its plant, and George K. Fisher is the consulting engineer for that work. The company has closed orders with the Case Mfg. Company for a 2-ton 34-ft. span 3-motor traveling crane, and the list of equipment to be installed includes a general line of machinery.

The C. Pardee Works, Perth Amboy, N. J., is still in the market for machinery equipment for installation in the proposed addition, and just now the trade is being asked to bid on the 300 kw. unit. Recently the company asked for bids on a 32-in. blooming mill and the contract for that has just been awarded to the United Engineering & Foundry Company. The company has in contemplation quite an addition to its plant, and probably there will be other machinery needs to be filled as soon as power equipment is arranged for.

The Syracuse Faucet & Valve Company, Syracuse, N. Y., is in the market for a 50-hp. engine, and has been making general inquiries on an electric generator, the exact size of which has not been decided upon. The equipment will be installed in a new 4-story plant to be erected by the company. The plant will be 60 x 120 ft., and it is thought that later on the inquiries now on the market will be followed by a list of other machinery.

The engineering firm of Runyon & Cary, 122 Market street, Newark, N. J., is getting bids on two 200 kw. engines and two 100 kw. engines to be installed in the power house of the new Essex County Hospital now in course of construction at Overbrook, N. J. Contracts will be awarded very shortly.

The Barge Canal Advisory Board, Albany, N. Y., has approved three new contracts for canal work which will entail an expenditure of about \$3,000,000. The contracts for this work have not yet been placed. The work covers contract No. 14, which calls for the construction of a permanent lake 10 miles long and $\frac{1}{4}$ mile wide; contract No. 17, construction of two movable dams and locks on the Mohawk river; contract No. 19, bridge highway work and Sulphur Springs guard lock between Lockport and Tonawanda, N. Y.

Bids will be received by the Aqueduct Commissioners of the city of New York at their offices, 280 Broadway, on August 7, for constructing a reservoir across the west branch of the Croton River, and earth diverting dams across the east and west branches of the river. The specifications include a number of steel derrick towers.

Bids will be opened on Monday by the Commissioner of Docks of the city of New York for furnishing electrical generating sets. The security required on the work is \$2800, and 60 days will be given for completing the contract.

Catalogues Wanted.—Paul S. Carter, 907 White Hall Building, New York, purchasing agent in the United States for the Philippine Islands, desires catalogues and discount sheets for the general receiver of customs of Santo Domingo, which he will be pleased to forward.

A feature of the Central Heating Station, Marion, Ind., is a pair of centrifugal pumps driven by Sturtevant inclosed vertical engines provided with forced lubrication for all bearings. These are employed for circulating the cooling water in connection with the condensing system.

Philadelphia Machinery Market.

PHILADELPHIA, PA., July 17, 1906.

Few sales of any moment have been reported by the trade the past week, and the market on the whole has been rather quiet. The larger propositions before the trade move slowly about this season of the year, and outside of a few orders from the Pennsylvania Railroad on account of its recent list practically nothing has been given out by the railroad interests.

The most important topic in the trade the past week, which has an important bearing on general conditions, was the allotment of a contract for 3694 tons of armor plate to the Midvale Steel Company for the battleships South Carolina and Michigan, while the contracts for the building of the vessels themselves were awarded to the Wm. Cramp & Sons Ship & Engine Building Company and the New York Shipbuilding Company, all being practically local concerns. These large contracts assure continuous active operations at each of the plants, and a certain amount of business both direct and indirect will no doubt naturally be derived therefrom by the local trade.

There has been some light buying of individual tools, most of which were of the medium sizes and of the lighter type, the majority of which could be supplied fairly promptly. The demand for heavy tools still remains quiet. Inquiries for all classes of machine tools are in good volume, but, somewhat like the larger propositions, have a tendency to drag. Much of this apparent inactivity can be attributed to the midsummer holiday season, which in many instances interferes with the prompt transaction of business.

Manufacturers of all classes of machinery and tools continue taking on a large amount of new business, and plants are generally fully occupied. The volume of new orders received, together with the inability to make high production during the heated term, precludes any possibility on the part of practically all the tool builders in catching up on delayed deliveries to any material extent. In fact, on some lines manufacturers have been compelled to further extend the time of what are already considered very long time deliveries.

The volume of export business continues on about an even plane. But little new business has been offered in the line of general machine tools, builders of which are so fully occupied with the home trade that but little determined effort to secure much of such of the foreign business that may be on the market is being made. Manufacturers of special tools and general special machinery, however, still continue transacting a good volume of business, while those having an established trade abroad report business for this season of the year fully up to the average.

Second-hand machinery and tools continue in good demand, and will no doubt do so as long as manufacturers of new tools are unable to make fairly prompt deliveries. In many cases the second-hand tools are purchased to enable buyers temporarily to tide over a press of business, or until new tools already purchased can be delivered. In some lines desirable tools are scarce, but dealers have been able in most cases to keep their stock pretty well supplied.

The demand for boilers and engines has not been active, although a large amount of satisfactory business is pending. The same condition is apparent in the second-hand engine and boiler trade. With the amount of new business in sight considerable improvement is looked forward to in these lines at an early date.

The foundry situation is good. Machinery castings in both iron and steel are in good demand, and foundries on the whole have as much business on their books as they can conveniently handle. Steel castings are probably the hardest to get with any degree of promptness, while some of the gray iron plants have their capacities fully taken, and occasional complaint of delayed deliveries is heard from users of machinery castings.

The Macungie Brass & Mfg. Company, Macungie, Pa., is about to erect a new machine shop, 40 x 100 ft., a brass foundry, 40 x 40 ft., and an engine house, 20 x 25 ft. In addition to the general equipment a 60-hp. engine and an 80-hp. boiler are to be installed. Bids for the latter will be received until July 28.

The Superintendent of Supplies of the Board of Education of the City of Philadelphia will take bids until 12.30 noon, July 19, for a lot of supplies and equipment for the Northeast Manual Training School, included among which are the following machine tools: 16 wood turning lathes, 12-in. swing, to be driven in batteries of four by constant speed electric motor; one pattern maker's lathe, type E; two wet tool grinders fitted with 10-in. wheels; one No. 1 improved tool grinder; one electrically driven screw cutting lathe, 14-in. swing, with 5-ft. bed; chucks and other appurtenances being included with the lathes; one 36-in. band saw with constant speed motor and approved nonvoltage starting box; $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ in. saws and supplies; one No. 3

improved saw bench, Calladay type, with direct connected constant speed motor, 110 volts direct current; one 14-in. rip and one 14-in. cross-cut saw, miter gauges, &c. Specifications may be had at the office of the superintendent, 297 City Hall.

The Standard Pressed Steel Company, manufacturer of pressed steel shaft hangers, reports a largely increased demand for its product, particularly for export. An agency has recently been established by the company with F. W. Horn, Yokohama and Osaka, Japan, while several agencies have been established in different parts of the United States. The month of June was the largest in point of orders received that the company has ever had, and every department of the plant is being operated at full capacity. Recent shipments include 650 hangers of various sizes for export to Austria, while a number were shipped to Adelaide, Australia, and other foreign points. Domestic deliveries have been large and cover many points in the United States.

The Eynon-Evans Mfg. Company notes a good demand for steam jet blowers, which have been supplied the various large steel, glass and lime manufacturers. Eighteen of these blowers have also been shipped for export to Manchester, England. The pattern department is extremely busy on work for large steel and shipbuilding plants, while the foundry is working at its full capacity on a varied line of brass and acid resisting bronze castings. Orders have been taken recently for several large surface condensers, including one of the 1000 kw. capacity. This company now has in contemplation the purchase of a number of tools in order to increase the facilities of its machine shop. Several lathes will, it is thought, be among the first tools to be purchased.

The American Pulley Company is rapidly completing additions to its plant. The work has interfered considerably with its shipping facilities and many orders particularly for export have been temporarily delayed. This condition, it is expected, will adjust itself in a short time. Business with this company is generally good and every department of the plant is fully occupied. Shipments of pulleys in carload lots to both Southern and Western customers are to be noted, while deliveries to nearby customers have also been large.

The Link Belt Engineering Company continues busy in every department. The demand has been large in all of its various lines, and a very satisfactory number of orders have recently been taken, including, among others, several cane and sugar handling outfits for export to Cuba; several phosphate handling outfits for Florida phosphate plants, and a number of hoisting and conveying installations for retail coal pockets, ranging from 1000 to 2000 tons capacity. Sales of a number of Trump concrete measuring and mixing machines have also been made, while an ingot conveying machine has been furnished the Raritan Copper Company, Perth Amboy, N. J., and an ashes handling plant installed at Alexandria, Va., for the Richmond, Fredericksburg & Potomac Railroad.

Cincinnati Machinery Market.

CINCINNATI, OHIO, July 17, 1906.

Builders of machine tools report an excellent business and the outlook very promising. A year or two since, when the wave of prosperity first made its appearance, it was noticed that a large number of the shops prepared to meet it by considerably increasing the size of their plants. It was then thought that such expansion would in all probability take care of any increase in business that might arise. It appears, however, that in very many instances this conjecture proved to be untrue, and what at that time was considered ample provision to meet all emergencies has since fallen far short of actual demands. The result has been that shop after shop has again taken up the advisability of adding to its present facilities, while others are planning to remove to new sites where they can obtain all the space desired. There is a deplorable scarcity of machinists that greatly influences any considerable increase in general output of the plants, due largely to the fact that at this season of the year quite a number of mechanics seek other occupations that during the heated term are more congenial and which in a measure allay their restlessness, resuming indoor work as cooler weather approaches. Aside from this labor conditions are apparently satisfactory and there is no friction evident.

The Lane & Bodley Company is preparing to add a foundry building to its plant at Bond Hill. This will greatly increase the output, and is probably a move in the direction of later utilizing the entire tract at that point for its plant. As transportation facilities are of the best, and connecting tracks run into the plant from both the Baltimore & Ohio, Southwestern and Pennsylvania lines, shipments both in and out can be made without delay or added expense.

The Cincinnati Planer Company is pushing forward the work on the addition. This will probably be but a temporary

makeshift, as the new site at Oakley will in the near future be developed and the plant removed to that point. Until that time, however, something had to be done to enable it to take care of the large number of orders that have been piling up on the books, making deliveries anything but satisfactory. Foreign trade is said to be exceptionally active, and is not confined to any particular section. Several heavy shipments have been made during the past two weeks to domestic points.

The Cincinnati Machine Tool Company reports that never in its history has trade proved so satisfactory. While facilities have been greatly improved and available space for placing machinery greatly decreased by the installing of a number of labor saving machines, with the output almost doubled, it is practically impossible to keep pace with new business that continues to be received from all portions of the country. Everything seems to indicate that the year will be far ahead of all previous records in the way of new trade.

The Cincinnati Milling Machine Company is rushed with orders. Some months since it was found advisable to increase the working capacity of the plant by utilizing the area bounded by the buildings as a workshop. This was done and the floor space greatly enlarged, but it has been found inadequate to meet present requirements, and consequently it has been found necessary to seek a location where the plant could expand as circumstances demand. To this end Fred A. Geier, president of the company, secured an option on about 100 acres of land at Oakley, where, in conjunction with three other manufacturers, a large colony factory will be established.

The Cincinnati Punch & Shear Company reports an unprecedented business for both heavy and light machines. Considerable Government work has come its way, as well as general demand from various sources. Several months since one of the shops of the city was equipped with a full complement of tools, all made by this company.

The Lodge & Shipley Machine Tool Company says that never since the organization of the company has it experienced such a well developed general trade. This not only comes from home points, but is fairly proportioned among foreign countries. Deliveries are apparently about the same as they have been, enough new business coming forward to keep them about evenly balanced.

The R. K. Le Blond Machine Tool Company is well taken care of in the way of future business and is experiencing difficulty in making deliveries as rapidly as desired. Work has commenced on the additional building, and it is anticipated that it will be completed within a short time and ready for the installation of machinery.

The King Machine Tool Company's new addition is about completed. Work on the interior will be finished in a week or two and the building utilized for manufacturing purposes. Trade is said to be excellent and showing no decrease.

Chicago Machinery Market.

CHICAGO, ILL., July 17, 1906.

Sales of machine tools and equipment by dealers and manufacturers throughout this district during the month of June greatly exceeded the records of similar periods in former years, and the usual midsummer lull in the machinery trade is conspicuous by its absence. Very few transactions figured in the month's total, the volume being made up largely of miscellaneous equipment for increasing the output of existing plants. The Allis-Chalmers Company, Milwaukee, booked more orders during the month of June than during any similar period in its history, the total sales amounting to over \$3,000,000, the foreign trade having contributed a fair percentage of this amount. The Illinois Central Railroad has not yet made purchases on the list recently promulgated, and it is probable that no awards will be made for at least 30 days. The extensive improvements at the Burnside shops will include a large car erecting plant, and experiments are now being carried on with various lines of tools to ascertain the most desirable and economical for the purposes for which they will be required. Second-hand machinery continues scarce and desirable tools still command prices almost on a par with new equipment.

The Allis-Chalmers Company, Milwaukee, Wis., reports that it took more orders for machinery during the month of June than during any period of equal length in its history. Sales aggregating over \$3,000,000 were made to steel mills, factories and industrial establishments of all kinds throughout the country, and a brisk foreign trade was also done. The manufacture of hydro-electric machinery is at the present time especially active, and the company has under construction and in various stages nearing completion no less than 43 hydraulic turbine units, aggregating 166,000 hp., for

shipment to various points of the United States, Canada and Mexico. Following the removal of the general offices from the Reliance to the West Allis works the entire north section will be devoted to the building of hydraulic turbines, governor and auxiliary equipment.

The Hoosier Stove Company, Marion, Ind., is in the market for quite a list of machinery and equipment for its plant. The following are needed: One cupola and the necessary furnishings for the foundry, two post drills, two horizontal stove drills, two cone grinders, eight emery wheel stands, two upright drill presses, one 4-ft. cornice brake for heavy steel, one 8-ft. cornice brake for heavy steel, one power press, two power punches, one hand power shear, one radial drill, one large power shear, knives about 3 ft. long; one Buffalo lathe, 10 or 15 motors of different sizes, one plating dynamo of 1500 to 2000 gal. capacity, two buffing lathes, two polishing lathes, one steel scratch brush stand, two exhaust fans, one for the emery wheels, and the other for rattlers, &c. The plant, which is now under construction and nearly ready for the roof, will comprise the following buildings: Office, 20 x 80 ft., two stories; wareroom, 80 x 200 feet; mounting room, 60 x 200 ft., two stories; foundry, 100 x 200 ft., with side lantern the entire length; boiler room, 30 x 38 ft.; washroom, 20 x 30 ft.; rattling room, 30 x 38 ft., and pattern room, 30 x 30 ft. The first floors of all the buildings, except the foundry, are to be cement. The foundry floor is to be 5 in. of tough clay taken from the site. The buildings are to be of steel construction and are to be completed by September 4, as the patterns are now well under way, and the manufacture of stoves and ranges will be begun early in November.

The Long Distance Telephone Sales Company, South Bend, Ind., is making improvements to its plant and is in the market for punch presses, small gear cutters, shapers, &c. The company is also in the market for sheet metals, brass, aluminum, &c.

Phelps, Dodge & Co. will build at their Pilares de Nacozari mine at Bisbee, Ariz., a new concentrating mill to cost \$1,000,000 gold. J. S. Douglas, superintendent of the Montezuma Copper Company, Nacozari, Sonora, Mexico, and H. K. Burch, mechanical engineer of the Detroit Copper Company, who has just completed the mill of the latter company at Morenci, will build the new concentrating plant.

The Department of Public Works of the city of Chicago is in the market for three horizontal return tubular boilers for the City Hall, and one high speed direct connected automatic cut-off engine and one 35-kw. direct current generator for installation at the Fourteenth street pumping station.

G. P. and A. P. Butterworth, Marion, Ind., and H. W. Lushey, Columbus, Ohio, are interested in a company, capitalized at \$75,000, which will build a plant for the manufacture of shoes. Electric motors for power will be purchased, together with necessary shafting, hangers and pulleys. The shoe machinery will all be bought of the United Shoe Machinery Company.

The city of Ottawa, Kan., will receive bids until July 20 on machinery and equipment for improvements and additions to the water works, electric light and power plants. There will be required electric centrifugal pumps, boilers and accessories, water works pumping engines, electric light and power engines, dynamos, switchboards and other electrical apparatus, together with other equipment.

The Idaho Light & Power Company is having plans prepared by Kelsey & Young, Portland, Ore., for a 2500-hp. electric light and power plant. Contracts will be let about September 1.

Wilder & Co., Chicago, are in the market for a 100-hp. Corliss engine and a 10-hp. gas engine.

The Shaw Electric Crane Company, Muskegon, Mich., has sold to the Panama Railroad Company eight wharf cranes of 4 tons capacity each. The span of the cranes is 11 ft., and the total height of the main tower is about 61 ft.

The Risdon Iron & Locomotive Works, San Francisco, Cal., has received an order from the Utah Copper Company for 1104 Johnston concentrators. This order supplements one taken during the later part of last year from the same company for 80 machines. The Risdon works has also just received an order from another copper company in Utah for 234 similar machines.

The Jeffrey Mfg. Company, Columbus, Ohio, has been awarded contract by the Fentress Coal & Coke Company, Wilder, Tenn., for a complete haulage and coal cutting plant, including boilers, engine, generator, locomotives, wiring, &c. The coal company is opening new mines and increasing its output.

Daniel Drawbaugh, Carlisle, Pa., a prolific inventor, announces that with the aid of Dr. B. E. Gamble he has devised a practical fuel to take the place of coal. This fuel is being manufactured at Bowmansdale, east of Carlisle, by a secret process. It is composed of chemicals and a fibrous matter and weighs only half as much as coal.

New England Machinery Market.

WORCESTER, MASS., July 17, 1906.

The demand for machine tools and kindred lines continues strong. The dealers are not complaining at the volume of their summer's business, but on the contrary are congratulating themselves at the totals which are piling up on their books to help bring the year up to the largest they have ever known.

The growing crops of New England are in a most promising condition and farmers look for a profitable year. This means a good deal to dealers in the various lines of machinery and tools which enter into farm equipment. The demand for farm engines has been heavy this season, largely because last year's crops were satisfactory. It looks as if this year will bring even better results, which means a still larger machinery demand from the farmers.

The National Machine Tool Builders' Association is giving serious attention to the recent suggestion that it would be a profitable and important function to regulate prices on a falling market, when business shall slacken, in the same manner that has been employed in advancing prices in the face of exceptional demand for the products of the works of the members. It is quite probable that this matter will be a subject for discussion at the annual meeting next fall, perhaps not with the intention of taking formal action, but rather to secure the co-operation of the members in readiness for the time when present high prices cannot be maintained in the face of a decreasing demand. There will be plenty of time to think over the question, for there are no signs of any description that business conditions will change for a long time to come, unless it be for the better, if such a thing is possible. The summer demand is something probably without precedent, there being no let-up in orders, and the tone of numerous inquiries received by builders of machine tools indicating a plentiful amount of business in the future. But every manufacturer realizes that sooner or later there must be some sort of a reaction, and the question is how the National Association can best meet such new conditions with the minimum of loss to its members, which means, of course, to the trade generally. The feeling which has prevailed in the past that in a falling market it is impossible to secure co-operation of the trade in maintaining prices seems to have been replaced by a growing sense of confidence that manufacturers generally would see the advantage which would be gained by fixing prices commensurate with the demand, so that all can get the best prices procurable under adverse conditions. The argument is wisely made that a maintenance of some fixed schedule of prices would not reduce the volume of business, and each machine tool builder would get as many orders and at the same time get them at prices which would be considerably higher than could be obtained in a helter skelter scramble, each making his own price, to the great advantage of buyers.

The secretary, Paul E. Montanus, of the National Machine Tool Builders' Association, has sent out a printed report of the Atlantic City convention, which contains a full account of the doings of the meetings, with the exception of the report of the committee which has in hand the matter of apprenticeship systems. Chairman E. P. Bullard, Jr., of the committee, has not his report fully in hand, but when it is ready it will be published by the association as a separate pamphlet.

The Boston machinery district will be deserted Wednesday of next week, when the auction sale of the equipment of the Shaw Machine Company, Lowell, will be held. The occasion promises to be an unusual event, with an attendance attracted not only of those who desire to secure the machine tools and other equipment and the materials which will be disposed of under the hammer, but also of those who wish to read the signs of the time in the bidding. It is presumed that prices will range high; if they do not it will not be considered a satisfactory condition by manufacturers and others who are interested in the future of the market. Probably there has never been so representative a gathering of New England machine tool men as will be seen on this occasion.

The Universal Machine Screw Company, Hartford, Conn., manufacturer of multiple spindle automatic screw machines, has been compelled to double its equipment by the installation of new machinery. The company has been manufacturing for the market but a short time, but the demand for the new screw machine, which was described in detail in *The Iron Age* of February 1, 1906, has been so great that extensions of manufacturing facilities became imperative. The shops formerly occupied by A. Clement, automobile manufacturer, Paris, France, were large enough to make possible the increase in capacity without enlarging the building. The company began manufacturing only a few months ago, but in the brief interim it has been demonstrated that the new machine is a success. It is the com-

bined invention of Christopher M. Spencer, who invented the screw machine which bears his name and others before it, and R. Hakewessell, the inventor of the first multispindle screw machine.

W. E. Laird, Pittsfield, Mass., for a number of years experimental man for the Stanley-G. I. Electric Mfg. Company of that city and recently superintendent of the Teleelectric Company, is to establish a shop in Pittsfield. Mr. Laird is not yet ready to give out the nature of his business, but it will require a machine shop. He is having some work done for him at present by outside parties, but he hopes soon to be doing his work in his own shop.

The Noera Mfg. Company, Waterbury, Conn., manufacturer of bicycle and automobile sundries and hardware specialties, is contemplating the erection of a new factory at Waterville, a suburb of the city, but has not yet decided on the details of the plans. The increasing business of the company makes larger quarters necessary.

The Davis & Farnum Company, Waltham, Mass., is to erect a large addition to its foundry.

The Holyoke Motor Works, Holyoke, Mass., manufacturer of gas engines and castings, is to build an addition to its works, 50 x 100 ft. and one story, to be used for foundry purposes.

The high prices of ice are having their effect on the demand for ice making and refrigerating machinery. Artificial ice plants are being established in several of the cities of New England, and refrigerating plants will be installed by users of large amounts of ice as being cheaper for the purpose.

The United States Column Company, Boston, Mass., has been organized in Massachusetts and will take over the business of the Lally Patent Column Company, 151 Congress street, Boston, and Waltham, Mass. The company states that it will be in the market for several pipe cutting machines of large sizes.

The business of the Eastern Forge Company, which is to be moved from Nashua, N. H., to Portsmouth, N. H., has been incorporated in Massachusetts under the new name of the Portsmouth Forge. The company has a capital stock of \$100,000 and the officers are: President, John Herbert; treasurer, Mathew T. Denham; clerk, Herbert A. Buck; directors, these officers and H. H. Stinson, J. W. Kelley and W. H. Hackett. The name of Eastern Forge Company will go out of existence. The company has taken the works of the Portsmouth Machine Company, which are being materially changed to conform with the requirements of the new business for the manufacture of forgings. New machinery will be installed in addition to that at the works at Nashua, and the new plant is expected to be ready for occupancy about October 1.

Nichols & Longworthy, Hope Valley, R. I., are to erect large additions to their plant. A building for the manufacture of engines will be 50 x 100 ft. and one story, and a second building, for the boiler department, will be 130 x 157 ft. The company manufactures engines and has large orders in hand for the United States Government.

Government Purchases.

WASHINGTON, D. C., July 17, 1906.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until July 31 for a valve re-seating machine, arbor press, punch and shear, planer, cranes, hoists, mitering machine and other supplies for the Charleston, Key West and Pensacola Navy Yards.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until August 7 for motors, grinders and other supplies for the Mare Island and Puget Sound navy yards.

The Isthmian Canal Commission will receive bids until July 28, circular No. 318, for bending rolls and other material.

Under bids opened May 10, circular No. 306, for machinery for the Isthmian Canal Commission, the following awards have been made:

Handlan-Buck Mfg. Company, St. Louis, Mo., class 6, one planer, \$450.

Fairbanks Company, New York, class 7, one 42-in. engine lathe, \$2500.

Niles-Bement-Pond Company, New York, class 8, one slotter, \$4025.

Under bids opened June 26 for machinery for the navy yards the Oliver Machinery Company, Grand Rapids, Mich., has been awarded class 440, one gang dovetailing machine, \$876, and class 498, one pattern makers' speed lathe, \$325.

The following awards have been made for supplies for the navy yards, under bids opened June 19:

Vandyck-Churchill Company, New York, class 11, one motor driven cold metal sawing machine, \$1457.

Fairbanks Company, New York, class 33, one pattern makers' wood lathe, \$376.

Under bids opened June 11, circular No. 311 B, six duplex steam and compound air compressors have been awarded to the Laidlaw-Dunn-Gordon Company, New York, at its bid of \$31,800.

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HARDWARE

THE importance of making due improvement of time and the great things which can be accomplished by putting the passing moments to the best use is a trite and well worn topic in the field of morals and literature. It has been shown repeatedly that time has a strange elasticity and capacity which enables those who recognize the opportunities it offers to put into it an amount of effort and a wealth of achievement which would seem quite beyond the reach of their easy-going and time-wasting comrades. The story of the great things which have been accomplished by those who have learned the secret of getting out of the passing days all that they offer as the hours and minutes come and go is a familiar one, rebuking and perhaps sometimes stimulating and inspiring many who, while they do not indeed desire to "kill time," and take a more worthy view of recreation and pleasure than regarding it as a pastime, still fail practically to utilize the fleeting days to anything like the best advantage. It has indeed been demonstrated in many a notable career how fruitful may be even the intervals and fragments of time, the value of which the great mass of persons fail utterly to recognize. The manner in which the moments have been made to contribute to some chosen work, the acquirement of a new language, the mastery of some branch of science, the writing of books which have enriched the world of letters, the promotion of personal culture, the accomplishment of high achievements in some of the many fields which open before enthusiasm and painstaking industry, is illustrated in many a career, the lessons of which in regard to the improvement of time have been so well enforced by moralists.

While, however, the duty of making the most of time is very generally given at least theoretical recognition, so far as the individual is concerned, there has been as yet no adequate discussion of the value of time in its relation to business life, and the necessity of using well every hour and minute in order to achieve the best results and attain the largest success. While the general principle is admitted, its application in the various departments of business has not been adequately considered, nor has the manner in which waste of time involves not only direct financial loss but the more serious loss of opportunity, been elaborated and applied to the different departments and phases of business activity. This consideration is suggested not so much as a broad and fruitful theme for those who care to give it formal discussion, as a subject of practical importance to which each merchant and manufacturer will do well to give most careful thought as related to his own interests and his own methods.

Some of the most directly practical phases of this subject, as applied to manufacturing, are referred to in a pamphlet noticed on another page. In this pamphlet, without argument and simply by means of tables, which are most obviously true as simple statements of mathematical fact, the author enforces the principle that a very small leak in the matter of labor, or what might seem to be a trifling waste of time, involves in the aggregate a serious loss of profit, while on the other hand a slight increase in the amount, the efficiency or the fruitfulness of labor materially augments profits. Some of the applications which are made of the figures thus

represented are suggestive and even striking. For example, it is pointed out that a corporation with a capital of \$50,000, employing 200 men at average wages of \$3 per day of 10 hours, and working 300 days in the year, and making only 6 per cent. on its capital, would not be able to pay any dividends on its capital if the 200 men employed should lose one minute in every hour. A similar principle is applied on the supposition that the force of employees is as small as 50 and working at \$1 a day.

The pamphlet also touches upon other phases of the labor problem, as, for example, when in regard to the eight-hour day it announces the following conclusion: If a corporation with \$50,000 capital, employing 50 men at \$3 per day of 10 hours and working 300 days per year, was making a net profit of \$3000 per year, or 6 per cent. on its capital stock, and its workmen should demand eight hours per day instead of 10, without doing any more work per hour, it would amount to a loss of \$9000 per year, equal to 18 per cent. on its capital stock. Anything, also, which adds to the productiveness of labor in the way of improvements or better manufacturing facilities contributes of course directly to the profit of the business, so that insignificant improvements, on the principles which we are considering, may have important results in the aggregate. This is illustrated in the statement that a corporation having a capital of \$50,000 and employing 200 men at an average wage of \$3 per day of 10 hours and working 300 days in the year, there being no profits with which to pay dividends, if improvements could be added so that each man could do 1 min. more work in each hour, such addition would amount to enough to pay 6 per cent. on its capital stock. Such considerations not only enforce the importance of the employer's guarding in every possible way against waste of time in the factory and of increasing the fidelity and effectiveness of his workmen, but also brings before the workmen in definite form facts and principles which should have a stimulating effect upon them if they have any regard for their employer's interests or their own.

Condition of Trade.

With the advance of the summer there is practically no change in the general business situation or in the important features of the Hardware market, the principal characteristic of which at the present time is the continuance of an active demand in what should normally be a quiet season. "We do not want any more customers until we can take decent care of our regular trade" was the comment of the president of a large manufacturing house with extensive domestic and foreign business when some new measures for the extension of business were suggested. The situation thus alluded to is representative of many manufacturing interests. Not a few factories, however, are catching up with their orders and beginning to accumulate some stock for the fall trade. There are, however, a great many lines in which merchants experience a good deal of delay in the execution of their orders. The prospects for a large trade in the fall are remarkably good, and with satisfactory crops there is every reason to believe that the volume of business will be very large. In foreign trade, which is making new records, Iron and Hardware products continue to hold an im-

portant place, and the indications are that there will be a further growth in this direction. Some manufacturers are yielding to the temptation of neglecting their export trade under the pressure of the home demand which overtaxes their facilities, but many, including some of the very large interests, are pursuing a wiser policy and making aggressive efforts to occupy foreign markets, while they make it a point of taking good care of customers with whom they have already established relations. Notwithstanding the fact that there is a somewhat relaxed attention to the details of business, on account of the vacation season, there is a general activity in both manufacturing and distributing circles, and the dominant note is confidence.

Chicago.

Trade in Hardware shows little change from week to week, the demand continuing unprecedentedly heavy for the summer season, and manufacturers almost without exception are behind on deliveries. Price changes since the first of the month, while affecting more lines than during the same period in June, have been unimportant and have by no means reflected the high level of values obtaining on raw materials. In Heavy Hardware a distinct improvement has been noted, largely due to the early resumption of many implement plants, and the purchases from store are in greater volume than heretofore, on account of the delay in mill shipments. The sale of Black and Galvanized Sheets from warehouses is particularly heavy, as direct shipments are deferred from 60 to 90 days and premiums are asked for certain sizes which are notably scarce. Notwithstanding the molders' strike, Malleable Castings are coming forward more promptly and Hardware manufacturers depending upon these parts are now in position to assemble their goods with greater facility. The practical failure of the hay crop in several States throughout the West and South has left large stocks of hay tools and carriers in the hands of both merchants and manufacturers, a situation just the reverse having followed last year's harvest. The movement of a considerable portion of these goods during the fall months will depend largely upon the amount of building that will be carried on in the agricultural communities, but on account of the high prices ruling on lumber and all classes of building material, the farmers are showing no disposition to build beyond imperative improvements. In lines such as Screen Doors and Windows and Wire Cloth the belated purchases of merchants are proving a surprise to the jobbing trade, and no doubt are due to the inadequate stocks secured earlier in the year.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Philadelphia makes no pretence at being a summer resort, but those of us who have been unable to get away have had very little to complain of in the way of heat thus far. We realize that we are not out of the woods, however, but feel like recording a vote of thanks for the almost ideal weather experienced up to the present time.

Trade for July has opened up in a very satisfactory manner. Settlement of the bituminous coal strike in the western part of the State, and the return of about 40,000 miners to work at shorter hours and larger pay, clears up about the last serious labor trouble in sight. In fact, there never was a time in which there was a greater demand for labor at full prices than at present.

The recent award by the Navy Department for the building of the battleships South Carolina and Michigan to our Delaware River ship builders, together with the armor plate, which will be made by the Midvale Steel Company of this city, means work to our local industries amounting to about \$10,000,000, and the employment of 12,000 or 15,000 mechanics for the next three years. A good deal of local indignation is expressed over the action of the department in dividing up this armor contract, giving only half of it to the Midvale Company, notwithstanding the fact that their bid was \$50 per ton

less than that of the next lowest bidder. The Government, however, can do some things that would not be tolerated in commercial circles, and the Midvale people will have to console themselves with the thought that "half a loaf is better than no bread." It does seem a little hard, however, that after investing millions in an armor plant, and after having been the lowest bidder for several times, resulting in the saving of over \$200 a ton to the Government on armor plate, they should be compelled to divide up with rival companies.

The Hardware district in this city is just at present somewhat incommoded and seriously disfigured by the lifting derricks of the subway contractors, which are being installed along Market street at the rate of two to a block. The inconvenience, however, will be more than compensated for by the convenience of having a four track electric road free from all surface obstructions, enabling one to get away from the congested street car conditions that we have suffered from in the past few years.

St. Louis.

NORVELL-SHAIPLEIGH HARDWARE COMPANY.—Summer and vacations are passing. Business keeps up in steady volume. In Missouri it has been quite dry, too dry for the corn crop; we are hearing complaints.

That competition is the life of trade is an old and trite saying. Recently the writer has been reminded of the truth of this saw. I have been observing the methods of the various manufacturers' salesmen who call on us. When a salesman represents a line upon which competition is keen it seems to me he is alert and active; he is very much interested in the size of his orders; he comes with an interesting story; the fire of battle is in his eye; he is looking out for points.

On the other hand, when the manufacturer's line of goods is comfortably controlled by an association or competition has been eliminated in some other way I have been impressed with the calmness of the manner of the salesman. He cools his heated brow with a palm leaf fan. His specifications are not quite ready; they may be mailed direct to-morrow or the next day. He is at peace with the whole world and charitably inclined toward all. Such a thing as the vulgar struggle for business is to be sincerely regretted.

It is an amusing thought that sometimes the calm, collected salesman of the association of one year finds himself the following season among the ranks of the fighters, while probably the strenuous salesman of today may to-morrow be carrying the palm leaf fan.

How energetic we are this warm weather! We have heard from several sources of the story being circulated that this house intends to go into the wholesale catalogue business. It is being painted we are preparing a yellow catalogue of stupendous size with horrible cut prices. It is being told we are to abandon the system of selling goods through salesmen. Really the story is quite sensational. We take this occasion to advise our friends in the trade we expect to continue to sell first-class goods to first-class merchants in the same old-fashioned way. We are not even stockholders in a wholesale catalogue house.

We will of course issue, as has been our custom for a number of years past, our usual spring and fall catalogues. We beg to allay the fears of some of our friends in regard to the fall catalogue now in preparation. There is nothing very startling about it.

The report that we are opening a department of 5 and 10 cent counter goods is all false; just a nightmare. We will continue to sell only the best goods in both manufacturers' and special brands.

Boston

BIGELOW & DOWSE COMPANY.—New England is enjoying exceptionally fine weather. Plenty of water to keep the mill ponds full and furnishing cheap power for the factories which are fully employed. Plenty of warmth for the growing crops, but not enough to make one uncomfortable. Gentle sea breezes do their part to make our city a very comfortable summer home.

Business continues its record-breaking pace and like

its preceding months July will show its proportional increase. The high wages paid in all our cotton and woolen mills seem to satisfy the employees and threats of strike and discontent are not in evidence this summer.

General prosperity prevails in the business circle and it will continue notwithstanding the attacks of the Bears and the Bulls on the stock market. The market prices for Hardware are firm and many lines show a tendency to advance.

The retail dealer who is in shape to buy or pay for his fall wants cannot make a mistake by placing his orders early. The "hand to mouth" buying that has prevailed so generally in the past will not "pay" this fall. There is certain to be a good business and the wise ones will prepare for it early.

Baltimore.

CARLIN & FULTON.—While July, as far as sales are concerned, is generally supposed to be rather a quiet month, and it is the season for vacations, there is always a considerable amount of work attending the receipt of stock in anticipation of the coming season which bears pretty heavily upon those whose vacations happen at some other season.

From all that we can hear there is every prospect of a most excellent business this fall, and while the acreage is considerably greater the price of cotton is still held up, which, if continued, will give the planter a most satisfactory return for his labor.

That there is a heavy distribution of goods throughout the entire country is shown by the activity of the manufacturers and reports generally made of "no accumulation of stock." The railroad earnings and the general employment of labor all corroborate the trade reports from all sections of the country, and with a demand as great as it has been there has been no necessity for any reaction in prices, but on the other hand a decided strengthening of the market.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—It is a pleasure for us to advise the good readers of *The Iron Age* of the splendid conditions that now exist in this part of the country. The city of Nashville is located in exactly the central point of the South, and is in close touch with all sections of the Southern country, and we believe in possibly better position to test the business conditions of the South than any other market. We can, therefore, truthfully say that we have never in our business career seen more satisfactory conditions or finer prospects than exist to-day.

Farmers and planters all over the South are as busy as bees, and the crops are blooming like a rose. The wheat crop in Tennessee and Kentucky has been harvested, and was one of the best crops we have had in many years. Corn, hay and other crops are looking remarkably well. The main product in the South, "King Cotton," never looked better at this season of the year, and unless something very unforeseen occurs, the cotton crop this fall will be very fine, and we believe will bring a satisfactory price.

In addition to its agricultural resources, the South is developing more and more its mining and manufacturing industries. Coal and iron, and phosphate mines are all being worked to their fullest capacity. New manufacturing plants are going up everywhere and all of them are running full blast.

The general store keepers and retail Hardware dealers are all doing a big business. They are selling more goods and a better class of goods than ever before. They are having better collections and are, therefore, paying their bills more promptly than ever. The fall trade has opened up with jobbers in a rush. Quite a number of the traveling men have returned from their vacations, fresh and full of new energy and vigor for the fall business, and those that have gotten out on the road are already sending in plenty of orders.

The sale of Stoves, Guns, Ammunition and Cutlery is particularly heavy. Also the business being done in Saddlery and Harness is breaking all records. Notwithstanding the high price of leather and leather goods,

there has never been such a trade in the Saddlery line at this season of the year. We look for a continuance of these conditions during the fall and winter months.

Portland, Oregon.

FAILING, HAINES & McCALMAN.—In this section business is first class. All dealers are rushed to their full capacity. Collections are very good, and apparently will be throughout the summer. As yet, there does not seem to be any indication of the usual summer lull. Building is going on at a great rate, this city standing third in the United States in increase in building permits for June. The crops promise to be fine, as the weather conditions have all been favorable.

Cleveland.

THE W. BINGHAM COMPANY.—We have little comment to make on the condition of trade now, as at this time of the year salesmen usually take their vacations, and of course business received from traveling salesmen is cut off for a short time, but the many orders that are coming direct to us by mail indicate that retailers generally are having a good trade. The farmers are busy harvesting their hay and tilling their fields of corn and potatoes. Still there is much trade in the evening and early in the morning at the country stores, which makes long business hours for the retailers.

We wish again to emphasize what we have said about the advance in price of many commodities, which the advance in labor and material warrants, and we are looking for the changes that are usually made at this time of year. We have received notices of changes in prices of some goods, and expect many more. The following articles have advanced: Builders' Hardware, such as house trimmings, 10 per cent.; some Stanley Rule & Level Company's goods, 5 to 10 per cent.; Chisels, 10 per cent.; Auger Bits, 10 per cent.; Handles for Shovels, &c., 10 per cent.; Disston's goods, 5 to 10 per cent.; Twines, 12½ to 20 per cent. An advance in leather necessitates a change in price of goods made of leather, such as Razor Straps, Halters and Leather Boot Taps, of about 15 per cent.

We think we are giving good advice to our friends when we say to them to supply their stocks liberally on all lines of goods for which they have a ready market, and to secure from their jobbing friends low prices on goods, as some of the jobbers are disposed to sell on a basis of prices obtained before the last advances. We are fairly well stocked on a great many lines of goods, and have contracts out that will admit of continuing to sell at low prices. "A word to the wise is sufficient."

NOTES ON PRICES.

Wire Nails.—In some parts of the country demand is especially heavy and prices generally are firmer, owing to the excellent condition of business, together with the closing of some of the mills and reduced production of others. Output is thus being kept as close as possible to demand, and stocks are not accumulating. The concession of 5 cents per keg from official quotations is less frequently heard of. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers.....	\$1.85
Carload lots to retail merchants.....	1.90

New York.—The local demand for small lots from store keeps up well for the season. Quotations for small lots from store are on the basis of \$2.10 per keg.

Chicago.—Several of the independent Wire Nail mills are now idle and several of the others are operating at only 50 per cent. of their capacity. The Nail trade is exceedingly quiet and by no means reflects conditions existing in other branches of the Wire trade. In other lines contracts are being freely closed covering requirements during the next 6 to 12 months, fence manufacturers figuring as the heaviest purchasers. The curtailment of Nail production has, however, strengthened the market and concessions are no longer reported. Quotations have been reaffirmed, as follows: \$2 in car lots to jobbers and

\$2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The Wire Nail trade is in very satisfactory condition, demand being heavier than usual at this season of the year and prices are firm, the concession of 5 cents per keg made for some little time on desirable orders having been practically withdrawn. The mills are being operated with a view of keeping output as close to actual demand as possible, thus preventing any accumulation of stocks either at the mills or with the jobbers. The supply of Steel is still short and some of the Wire Nail mills are unable to run full on this account. Large shipments of Wire Nails continue to be made to San Francisco, and some of the mills that have been closed since July 1 for inventory and repairs will likely start this month, if assured of a supply of Steel. Official prices, which are now only occasionally shaded, and not over 5 cents per keg, are as follows: Wire Nails, \$1.85 in carloads to the large jobbing trade and \$1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—A meeting of the Cut Nail Association is scheduled for July 25. The market shows increased firmness, owing to the scarcity and high prices of steel, and to the closing of mills for the annual repairs and inventory taking. The \$1.80 base price is, however, reported as being shaded 5 cents per keg by some mills outside the association. Official quotations are as follows: \$1.80, base, for carload lots, f.o.b. Pittsburgh; \$1.85 for less than carloads, f.o.b. Pittsburgh; \$1.95 for carload lots, on dock, New York; \$2 for less than carloads, on dock, New York. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

New York.—Demand for small lots from store is somewhat light, but not unduly so in proportion to that for Wire Nails. Quotations for small lots from store are on the basis of \$2 per keg.

Chicago.—With the closing down of some of the mills some strength has developed, but the basis of trading continues principally on contract orders. Such specifications are liberal and above normal for this time of the year. Quotations are as follows: Steel Cut Nails in car lots, \$1.90 to \$1.95; less than car lots, \$2; Iron Cut Nails, \$2 to \$2.05 in car lots; less than car lots, \$2.10.

Pittsburgh.—The market is decidedly firmer, due to the shut down of a number of the Cut Nail mills on July 1 for inventory and repairs, and which are still idle, this taking a large production out of the market. The scarcity and high prices of Steel also have the effect of strengthening prices. Current demand is fair, but the mills are running mostly on contract specifications. We quote Cut Nails at \$1.75, base, f.o.b. Pittsburgh, for carload lots, and \$1.85 in less than carload lots. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 to 10 cents advance on Steel Cut Nails.

Barb Wire.—Demand is fair, coming largely from railroads, as requirements from other sources are light. Concessions from regular quotations of 5 cents per 100 pounds are occasionally reported. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in ten days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.00	\$2.30
Retailers, carload lots.....	2.05	2.35
Retailers, less than carload lots.....	2.15	2.45

Chicago.—The midsummer tonnage is of fair volume and is in excess of that booked during the same period last year, the railroad requirements being unusually heavy on account of the many extensions that are being made by Western lines. Quotations are firmly maintained, as follows: To jobbers, Chicago, car lots, Painted, \$2.15; Galvanized, \$2.45. To retailers, car lots, Painted, \$2.20; Galvanized, \$2.50. Retailers, less than car lots, Painted, \$2.30; Galvanized, \$2.60. Staples, Bright, in car lots to jobbers, \$2.10; Galvanized, \$2.40; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Railroads continue to be the largest buy-

ers of Barb Wire, the amount of tonnage coming in from other consumers being small. Prices are firmer, but are occasionally shaded 5 cents per 100 pounds on attractive orders. Official prices, which are sometimes slightly shaded, are as follows: Painted Barb Wire, \$2, and Galvanized, \$2.30, in carload lots to the large jobbing trade, with the usual advance of \$1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Fence manufacturers are placing liberal contracts for Wire, these exceeding in volume those of the same period last year. On account of higher prices of Steel and the closing down of some of the mills prices are firmer. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.70
Retailers, carloads.....	1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows.

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base	\$0.05	.10	.15	.25	.35	.45	.55	1.05	1.15
Galvanized....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—Heavy contracts are being placed by Fence manufacturers for their requirements, and contracts thus far this month greatly exceed those booked during the same period last year. Specifications from manufacturers are in excess of mill capacity, the shortage of Steel to a considerable extent curtailing the output. Prices continue to be well maintained, as follows: To jobbers, \$1.85, f.o.b. Chicago, in car lots, and car lots to retailers, \$1.90.

Pittsburgh.—Some large season contracts for Fence Wire are now being placed with the mills, this tonnage being heavier than was placed last year. There is also a fair demand from other consumers. Prices are firmer, due to the shutdown of some of the mills on July 1 for inventory and repairs and also on account of the shortage and high prices of Steel. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.70
Retailers, carloads.....	1.75

The above prices are for base numbers, 6 to 9.

Bale Ties.—A shortage of Bale Ties is reported, the American Steel & Wire Company being from 30 to 60 days behind on its deliveries. This is due to the increased consumption of Ties on account of the short hay crop in many districts, making it exceedingly profitable for the farmers to bale their product for shipment into the districts where the shortage exists.

Aluminum.—The Pittsburgh Reduction Company, Pittsburgh, Pa., has issued a price-list which went into effect July 9, in which some slight changes appear. Aluminum Ingots, No. 1, over 99 per cent. pure, are quoted at 39 cents per pound in less than 100-pound lots, and 37 cents per pound in 100-pound lots; and No. 2, over 90 per cent. pure, 36 cents per pound in less than 100-pound lots, and 35 cents per pound in 100-pound lots. In addition to Ingots prices are given on Casting Alloys, Drawn Rod and Wire, Plate and Sheet Aluminum, Seamless Aluminum Tubing, &c.

Wire Picture Cord.—The Associated Manufacturers of Wire Picture Cord are sending out the revised list which was given in our last issue and is used by most of the manufacturers. The Andrew B. Hendryx Company, New Haven, Conn., is, however, adhering to the old list, which the company has used for a number of years and is maintaining practically the same discounts as have been in force for some time.

Paris Green.—The season's demand for Paris Green for use on potato vines is about over, and little has yet been ordered from the South, for the suppression of the cotton worm. Some manufacturers are entirely sold out and will make no more this season. The base price remains unchanged, at 21 cents for Arsenic kegs, for 5 tons or over, with the usual extras for smaller quantities.

Rope.—A fair demand for the season characterizes the market. Prices for Hemp are reported as unchanged, as are also those for Rope. Quotations are as follows:

Pure Manila, 12½ cents; B quality, 11½ cents; Pure Sisal, 9 cents; No. 2 quality, 7¼ cents per pound.

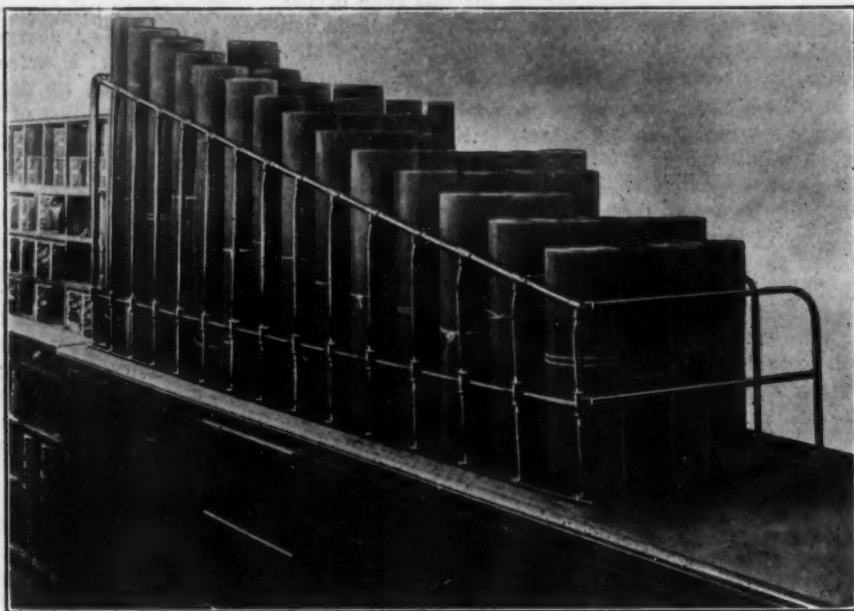
Window Glass.—At a meeting of Western jobbers last week it was decided to make no changes in prices until August 1, when it is intended that the price of single strength Glass is to be advanced to 90 and 5 per cent. discount, and double strength to 90 and 10 per cent. discount. Quite a demand for single strength Glass is in evidence, of which there is a shortage. According to parties who are supposed to be well informed it is estimated that there were about 6,000,000 50-foot boxes of Glass manufactured during last fire, which amount is referred to as being less than was generally supposed to have been manufactured. Quotations from jobbers' list in this section are as follows: Greater New York, single, 90 and 5; double, 90 and 10 per cent. discount. Eastern district, except the Boston district, 90 and 10 per cent. discount, for all sizes of single and double strength. In the Boston district quotations are reported as being 90 and 15 for all sizes of single and double strength.

Linseed Oil.—Business continues light and demand covers present requirements only. Seed has fluctuated up or down from ¼ to ½ cent per bushel during the past few days, but does not affect the price of Oil. The market shows some weakness on Oil for August and September deliveries. Quotations are as follows, according to quality and seller: City Raw, 39 to 40 cents per gallon; out of town Raw, 36 to 39 cents per gallon. Boiled Oil is 1 to 2 cents advance per gallon over Raw.

Spirits Turpentine.—Local demand has been very quiet so far this week, and prices remain unchanged though weak at our last quotations. New York quotations are as follows, according to quantity: Oil Barrels, 59¼ to 60¼ cents; Machine Made Barrels, 60¼ to 60½ cents per gallon.

COUNTER RACK FOR WIRE CLOTH.

THE Wire Cloth Counter Rack illustrated herewith has been devised by the Hardware jobbing house of Morehouse & Wells Company, Decatur, Ill. The company has made use of many Racks for this purpose in the course of its extended career, but refers to the one shown as the most convenient and satisfactory yet tried. The Rack is constructed of ¾-in. gas pipe and fittings, formed, threaded and put together in the company's own workshop. The length of the Rack is 8 ft. and its width 31 in. The height at the lower end is 14 in. and at the upper end 36 in. It is, of course, obvious that the length of the Rack can be increased or diminished to accommodate a greater or lesser amount of Wire Cloth. The Rack shown provides for the accommodation of 14 different widths of cloth, five rolls to a width, or 70 rolls of cloth altogether.



Counter Rack for Wire Cloth.

REUBEN H. MORLEY IS DEAD.

AFTER traveling many thousands of miles, involving the crossing of the Pacific Ocean twice and 37 days of hard marching up country in northern China, George Walter Morley, Jr., of Morley Bros., Saginaw, Mich., returned to that city on Saturday last, 14th inst., convinced that his brother, Reuben H. Morley, in search of whom his adventurous journey was undertaken, is dead. This view has for some time been held, but it remained for Walter Morley to collect the evidence, and to trace the movements of his brother to the last hour he was seen

alive. With the evidence obtained by Mr. Morley, backed up by his personal observations, as well as what was known prior to his going on his mission, there seems to be no room to doubt that on the 3rd day of September, 1905, Reuben H. Morley met with foul play at the hands of one in whom he had placed implicit confidence, and whom he had made his traveling companion. From Mr. Morley's description of the locality in which his brother was murdered, it is a vast desert of sand, one of those barren places on the surface of the earth where only those live who have never known different, and which are only visited by others possessed with the spirit of adventure and travel, as was Reuben Morley. In a day, even in an hour, the whole surface is changed by the shifting sands, moved by great storms. Mr. Morley brought back with him a large quantity of personal property belonging to his brother, which had been left at Peking.

DIRECT STEAMER SERVICE RUSSIA TO THE UNITED STATES.

A DIRECT steamship service between Russia and the United States, projected before the late Russo-Japanese war, has just been inaugurated by the dispatch of the steamer Smolensk from Libau, on the Baltic Sea, in Russia, to New York, touching at Rotterdam. The Petersburg, also of the Russian Volunteer Fleet, is fitting out to follow in September, the Saratov expecting to enter the service in November next. The importance of this enterprise is in the establishment of direct steamer connection between the United States and Russia, with proposed frequent and regular sailings, and the opportunities for greatly enlarging our export trade with Russia, especially in American manufactured goods. Heretofore the transshipment of freight at English, German and Scandinavian ports greatly hampered the growth of such business. Some of these vessels have a cargo capacity of 7300 tons, have twin screws and are capable of 21 knots per hour speed. C. B. Richard & Co., 31-33 Broadway, New York, are the general agents of the line.

Another similar and competing line has also been

inaugurated between Libau and New York, to be known as the Russian East Asiatic Steamship Company, of which Emil L. Boas, of the Hamburg-American Line, New York, is the general agent. This line will be established by the dispatch of the fine steamers Albingia and Allemania, other first-class passenger steamers being added as the conditions warrant.

Application is about to be made for a charter for the Leshner Lumber & Supply Company, Pittsburgh, Pa., which will handle Hardware, Lumber and Builders' Supplies.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

TOOL WINDOW WITH SHAVINGS AS TRIMMINGS.

A NOTABLE window display was recently made by Bracy Bros. Hardware Company, Little Rock, Ark. From the accompanying illustration a pretty good idea of its arrangement and striking character may be obtained. The decorations of the window were shavings, all smooth, clean and well cut, which appeared on the floor, in the corners, on the sides and on the ceiling of the window. Only tools were shown in the window. Saws were suspended from the ceiling with Jack Chain. Plane Boxes were nailed to the wall, with the Planes directly under them. As most of the goods in the window were of Stanley make, a card reading as follows occupied a prominent place: "Stanley's goods stand for the highest standard of good tools. This is Stanley's Headquarters. Respectfully, Mr. Stanley." Other cards were to the effect that "Our tools cut clean; no splinters, but shavings; a shure edge that does the work." "It's a sure edge if you get it at Bracys'," &c. Price cards were also in conspicuous evidence. This unique window display brought many compliments to the company, and also materially served to stimulate interest in and purchases of tools. The idea and make-up of the window are to be credited to A. V. Walker, treasurer of the company, who is to be congratulated on a very effective Hardware exhibit.

THE June issue of the *Hardware Store News*, published by the Walter Hardware Company, South Milwaukee, Wis., contains articles on Roofing, Refrigerators and the efficient care of the lawn in addition to some crisp items concerning the store and its management and announcements relative to season goods.

METHODS OF A CANADIAN FIRM.

There are few people within eight miles of our store whom we do not know personally or by reputation. We try to be friendly with everybody and to make them feel at home when they enter the store.

THIS is the way in which McGregor & Co., Caledonia, Ont., refer to their acquaintance and familiarity with the people in the territory from which their business is drawn. Caledonia is a place of about 1000 population, and its stores are mainly dependent on the farmers in

the neighborhood for business support. In addition to handling Hardware, Stoves, Paints, &c., McGregor & Co. also carry on an insurance business, fire, life, accident, &c. In canvassing for the latter, Mr. McGregor travels over a good deal of territory and on these trips meets people generally in their own homes and in this manner forms the acquaintance of many.

The firm guarantees every article sold to be exactly as represented or refund money or exchange. In following out this policy they advise us that they probably do not have to refund money five times during the year. This guarantee of their goods they always emphasize and it is one of their strongest assets. They aim to be strictly honest with everybody and as far as possible sell every one at the same price.

The firm advertises freely, through the local papers and by means of sign boards on fences. Circulars and



Tool Window with Shavings as Trimmings.

other printed matter are also at intervals sent through the mails and are found to be effective trade winners. A poster issued some time since illustrated a few selections from its stock, the intimation being given that if anything in Hardware is wanted the firm "either has it or can get it" for customers.

JOHN H. BARR, for many years engaged in the Hardware business in Nashua, N. H., died in that city July 12, aged 56 years. For 24 years he was a member of the Hardware firm of Barr & Co., and in 1894 established the Barr Hardware Company.

THE Steubenville Hardware Company, Steubenville, Ohio, has commenced the erection of a three-story addition, 43 x 65 ft., to its present building.

DEATH OF LORING COES.

LORING COES, inventor of the Screw Wrench and for 65 years a manufacturer of Wrenches and Machine knives, died at his residence in Worcester, Mass., Friday, July 13, aged 94 years. Up to six months ago he had been active in the conduct of his large business, going to his office daily and giving to his affairs the same measure of attention which characterized his manufacturing life when he was a much younger man. Not only did he continue to manage the business of the Coes Wrench Company and Loring Coes & Co., Incorporated, of both of which he was president and treasurer, but he gave much thought to the development of the shop end, his work including the invention of new machinery and improvements in processes of manufacture. He had practically never been ill in his life until his last sickness. A wonderful constitution, assisted by a wise regimen of living, had combined to keep Mr. Coes intellectually and bodily sound many years beyond the time usually allotted to the useful days of mankind.

The exceptional creative and inventive ability which first showed itself before 1840, when he thought out the secret of the successful Screw Wrench, stayed with him after he had become a nonagenarian, and valuable patents on Wrenches and machinery stand in his name on the books of the patent offices of this and other countries, issued during the last few years of his life. Notable among his more recent inventions are milling devices, now in use in the Coes shops, two patents having been issued to him when he was 93 years old for continuous milling machines for finishing Wrench jaws, which constitute a marked advance in manufacturing method.

Under Mr. Coes' guidance great changes were effected since 1901 in the business of the Coes Wrench Company and Loring Coes & Co., Incorporated. He purchased the interests of other members of the Coes family in the Wrench business and practically consolidated it with the Knife manufacturing business of Loring Coes & Co., Incorporated. He erected new buildings, improved methods of manufacture and of the sales end of the business and added new lines. He planned and carried out in all their details large business matters which would have taxed the energies and resources of many young and capable business men.

But at last the breaking up of his constitution came early in the year, when a trouble of the heart asserted itself. Mr. Coes rallied from the first attack, but his great age and the natural undermining of vigor which time must bring with it finally resulted in death.

Loring Coes possessed a rare combination of business and mechanical traits. He was an inventor of very unusual type; his ideas were numerous, commercially practicable and abreast of the times. Always, up to the very last of his days, he never failed to take advantage of those developments in mechanical arts and science which could be applied to his business. He was never what is sometimes called "old fashioned" in his ideas. As a striking example, when new high speed steels were brought out he quickly saw their advantage, and the milling machines already referred to were made possible in replacing grindstones because he could use high speed

cutters in accomplishing a result which he had long hoped to achieve.

The mechanical side of his intellect did not dwarf a keen business instinct, and the financial management of his business, as well as the sales end, was as well looked after as the mechanical. He was a good judge of men and gathered about him those who could manage the business in all its departments in his absence, forming a strong, well balanced executive and mechanical staff. As a man who lived his days in his family and his business, he planned wisely in providing for the management of his large manufacturing interests after he had gone.

Loring Coes was born in Worcester, April 22, 1812, the eldest son of Daniel and Roxanna Coes. His father was a farmer, and the boy assisted on the farm and attended school a few months in the winter. At 14 he was apprenticed to the carpenter's trade. Upon becoming a journeyman he found employment in his trade and later as a pattern maker, and then made a contract with Henry Goulding, a manufacturer of woolen machinery, to do all woodwork on the machinery. He employed six or eight men on the work. At that period all machine

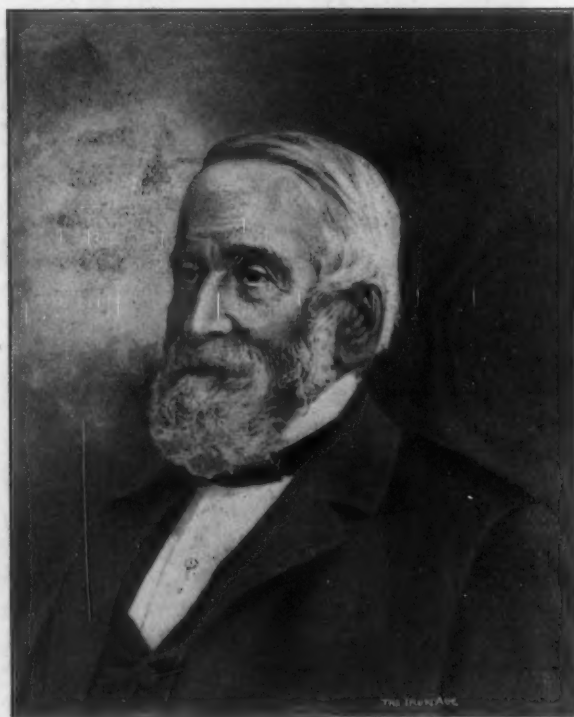
frames were of wood, and Mr. Coes retained in recent years the ability to build an experimental machine of wood and, in fact, preferred this method, because of the rapidity with which an idea could be worked out as a machine, ready for test and experiment.

He continued under this contract until 1836. He had saved some money and with his younger brother, Aury G. Coes, formed a co-partnership and bought the woolen machinery business of Kimball & Fuller. In 1839 their shop was destroyed by fire, and their loss so impaired their capital as to prevent their starting again. So the brothers moved to Springfield, Mass., and went to work as pattern makers. It was during this period of his life that Mr. Coes worked out the problem of the Screw Wrench which could be operated by one hand.

There were at that time two styles, one of English invention and the other known as the Springfield or Merrick Wrench. The mechanism of both was such that both hands were used to open or close them. This was inconvenient, as it was often important to adjust the wrench to different openings by the hand in which it was held, leaving the other hand free for other demands of the work.

It occurred to Loring Coes to dispense with the screw on the shaft, as in the Merrick Wrench, and to affix by the side of the shaft a small bar in the form of a screw, which should enter another screw formed in the lower or movable jaw of the Wrench, and that the first screw should also have, at its lower end, where it should enter the handle, a rosette always in reach of the thumb of the hand that held the Wrench. This rosette, being pressed and turned by the thumb, would operate the screw, and the opening and closing of the Wrench would be easily effected by one hand. It seemed to him that this adjustment would make the tool much stronger by removing the indentations from the bar or shaft, and that there would be less liability of injury to the Wrench from severe usage or improper handling.

The brothers returned to Worcester in November, 1840, and at once directed their efforts to securing a patent on the Wrench. The patterns of the spinning ma-



LORING COES.

chinery which they had manufactured had been saved from the fire, and with the proceeds of the sale of these a patent was secured, issued to Loring Coes, April 16, 1841. Soon afterward the patent records at Washington were destroyed by fire and consequently first papers were not obtainable, but a sketch made by Mr. Coes, still in existence, shows a hand making the adjustment of the Wrench by the thumb and rosette.

The brothers formed a co-partnership under the name of L. & A. G. Coes for the manufacture of Wrenches under the patent. They were without capital, and Henry W. Miller, a Hardware merchant of Worcester, assisted them by fitting up a shop with the necessary machinery and tools, of which he retained ownership, taking and selling all Wrenches manufactured. The business was so successful that in 1843 they were able to purchase their shop equipment. They were then employing three hands. They made a contract to sell their goods with C. Foster & Co., Hardware merchants, predecessors of the Duncan & Goodell Company, Worcester, and moved to larger works the next winter, the owner building a blacksmith shop and trip hammer for their use. It must be remembered that every part of a Wrench was then made by hand, even the screws being cut in a lathe.

At the close of their contract with C. Foster & Co., in 1848, the firm entered into a contract with Ruggles, Nourse & Mason, now the Ames Plow Company, to handle their goods, and when this contract expired, in 1853, the brothers undertook to sell their own product, in which they were eminently successful. In 1848 L. & A. G. Coes purchased a mill and water power. They were employing from 12 to 15 men and were producing from 500 to 600 Wrenches a month. They put in a new water wheel and new machinery. During the period since the establishment of the business the brothers had individually or jointly devised various improvements in Wrenches and in the special machinery used in their manufacture.

The Coes Machine Knife business was established in July, 1853, when the brothers, with Levi Hardy, purchased the shop, machinery and business of Moses Hardy, manufacturer of Shear Blades and Knives for Hay Cutting Machines. This triple partnership continued until 1864, when Mr. Hardy retired, and the business was continued by the brothers, the accounts being kept separate from those of the Wrench business. In 1866 a large shop was built, receiving power from a recently constructed reservoir, and the next year they built a second reservoir.

In April, 1869, Loring and Aury G. Coes ended their partnership and divided the business, Loring Coes taking the Shear Blade business and one mill privilege. He built a new factory and continued the manufacture of Machine Knives as Loring Coes & Co., deferring the resumption of the manufacture of Wrenches until a large shop had been built, which was completed in 1871.

Logical improvements, whose need became apparent, were made and patented year after year by Loring Coes. The Wrench was strengthened and made better in balance, and in 1885 the "Knife Handle," or scaled and riveted handle (also his invention), replaced the old round handle made of a single block. This model was so successful that it practically forced the re-consolidation of the Coes family into the Coes Wrench Company, the new partners being nephews of Mr. Coes. Improvements and patents followed, and a successor to the original model was made in 1895.

About a month before his ninetieth birthday anniversary Loring Coes bought out the interests of his associates in the Coes Wrench Company and acquired full ownership in the Wrench business, and in June, 1902, consolidated the entire business in the corporation known as Loring Coes & Co., Incorporated. It was in 1901, shortly before the change in ownership had been consummated, that a superior model Wrench was designed and patented through the management of Loring Coes & Co., Incorporated, and this in turn was supplanted by twin models, with wood and iron handles. Since the consolidation of the two companies under a single ownership both branches of the business have developed very rapidly, the product being greatly increased in volume, with corresponding improvements in design.

Mr. Coes married Miss Harriet N. R. Reed of Attle-

boro, Mass., in 1834. Mrs. Coes died in 1901. They had four children, only one of whom, Chester E. B. Coes, is living. Another son was Frank L. R. Coes, father of Frank L. Coes, vice-president and manager of the Coes Wrench Company and Loring Coes & Co., Incorporated. Mr. Coes left two great-grandsons, the sons of Frank L. Coes.

Mr. Coes was a man of quiet tastes. He took a deep interest in public affairs, but was not active in politics, although he served his city as a representative in the Massachusetts Legislature and as an alderman and common councilman. He was a director of the Worcester Electric Light Company and the City National Bank. Mr. Coes was a very enthusiastic and expert fisherman and made pilgrimages to the Maine lakes for many years, his last, in the spring of 1905, being his forty-seventh consecutive annual visit to the trout and salmon regions of Maine.

The funeral was held at the family residence Sunday afternoon. Rev. Clifton H. Mix, pastor of Pilgrim Congregational Church, of which Mr. Coes was a member, officiated. There was a large attendance of friends, including a number of gentlemen prominent in the Hardware trade.

SAMUEL WINSLOW SKATE MFG. COMPANY.

THE new Ice Skate catalogue of Samuel Winslow Skate Mfg. Company, Worcester, Mass., is a handsomely bound pamphlet, the cover showing the wreath of hollyleaves and berries, which was adopted as the distinguishing characteristic of last season's advertising poster, the wreath in this instance being on a primrose background. The same design and coloring distinguishes the large advertising sign, which will be distributed in the trade, the lettering and design being shown in relief. In this catalogue each half tone of Skates has a page to itself, with no lettering, excepting the numbers of the Skate shown. The index refers to the proper page for the illustration of each Skate. The tabulation of the various lines is very complete, and at the same time very concise and simple. It will enable a salesman to quickly answer any question which may come up from a customer or in the ordinary run of business. Reading across the page is found the Skate number, whether it is for men or women, the style of fastening, the style of runner, the finish of parts, the style of plates, the finish of Skate, whether boxed or papered, the size and the price. Each general type of Skate has its own table; that is, there is a table for Winslow's Hockey Skates, Winslow's St. Nicholas Rink Skates, Winslow's Wood Topped Skates and Winslow's National Club Lever Clamp Skates. The catalogue contains the full telegraph code. While the line of Skates shown is not radically different from those of recent years, still a change is noticeable, because of the tendency, resulting from the rapid coming in of the Hockey Skate, for an open Skate, one without a lot of levers, screws and other small parts. This applies not only to Hockey Skates, but also to rink and figure Skates and Skates for general use. The change in demand has led the Winslow Company to make a lot of Skates in various grades and varieties to meet this new order of things. Largely influential in altering the fashion in Skates has been the game of hockey, which has been taken up by colleges, preparatory and high schools, and athletic clubs, establishing an athletic winter sport, which ranks with the warm weather games of golf and tennis. One outcome has been that the sale of Skates is not of the Christmas present order, but for use as soon as skating is a possibility, in rink or on lake or river.

NICHOLSON FILE COMPANY, Providence, R. I., is distributing two new sheet metal hangers advertising its Nicholson and Kearney & Foot brands of Files. The signs are oval in shape, about 9½ in. long by 6 in. wide and are attractively colored in yellow and white, with black type and cuts. The company announces that it will mail these signs direct to retail Hardware merchants or they can be secured with shipments from the wholesale trade.

Correspondence.

A Reply to Ed. Ford.

To the Editor: In your issue of July 5, page 51, is an article by "Ed. Ford," which does an injustice to the Southern Hardware jobbers, in that he charges that we are trying to get adopted a standard loose leaf catalogue, after which we hope or intend to have the manufacturers furnish the pages free of cost and that the manufacturers will refuse to be "done."

His conclusions are clearly wrong. We are trying for the adoption of the catalogue, but we propose to pay for what we get, Mr. Ford to the contrary, notwithstanding, and it never has been our purpose to impose any expense on the manufacturer. The jobbers want the convenience of the catalogue and are willing to stand the expense, hence we do not understand where Mr. Ford got the idea that we were looking to the manufacturer to furnish anything free.

He refers also to our resolution concerning manufacturers selling semi-jobbers. The fact is the use of the word semi-jobber is a freak of phraseology, because there is no such thing. If Mr. Ford could be induced to put in a few years as a jobber of Hardware and find that after he had invested his money, equipped his plant and was in position to do business as a jobber the manufacturers began to sell the trade that he had a right to hope and expect to sell, and selling them, too, at the same price he had to pay, he would not be long in concluding that some kind of action was necessary for his welfare and protection.

We will assume, for example, that Mr. Ford has a business in Fort Smith, Ark. He would have, say, \$150,000 invested, and proposing to conduct a legitimate jobbing business. Northeast of us is the town of Van Buren, Ark., with a population of several thousand and a good, big retail store that jobs some goods that they can buy in car lots—to wit, Nails, Wire and Fencing. They could not sell a car of Strap Hinges, Refrigerators, Wagon Woodwork, Roofing, Bar Iron, Pumps, Scale Beams, Poultry Netting or Boys' Wagons in three years because the distributing territory is not adjacent. Hence the jobbers contend that unless the facilities and capital are both available for a legitimate jobbing business that it should not be encouraged, because it creates a tendency to overload and a consequent underselling to unload, thereby begetting demoralization and disorder all along the line.

Concerning the discussion of the integrity of contracts, that question was proposed by the manufacturers, and I charge that if contracts have been lightly held the manufacturers have been *particeps criminis* in that the contracts have been loosely drawn and infrequently enforced.

Our meetings with the manufacturers have been pleasant and profitable, and we will not allow "kickers" of the Ford school to interfere with a happy denouement of the catalogue question, nor any question coming up for adjudication. I think we understand each other pretty well and thoroughly now, and if there are a few like Ford whose chief forte is criticism there are many who are really in earnest and who want to get the best results.

The terms "held up" and "touched" may have a place in Bowery parlance, but are decidedly out of place in polite correspondence.

W. W. WEBBER,

Secretary-Treasurer Southern Hardware Jobbers' Association.

FORT SMITH, ARK., July 10, 1906.

C. A. HOAGLAND recently celebrated the twenty-fifth anniversary of his business connection with the house of John H. Graham & Co., New York, he having entered the employ of Graham & Haines, originally at 82 Chambers street, June 30, 1881. Mr. Hoagland entertained at luncheon and dinner the traveling men, office force and two principals of the firm. William A. and George A. Graham, at his home in Griggstown, N. J., there being

18 present. Remarks and felicitations appropriate on such an occasion were made by all in attendance, and at opportune times a number of gifts were presented to the host, as evidences of the respect and esteem in which he is held by the guests. Among the remembrances were a sterling silver tea set from the Messrs. Graham, a pair of cut glass vases from the traveling and office staff, and a rare German tea set in pottery, inlaid with silver, from the New Departure Company, whose product the house markets, a handsome umbrella, &c.

CONNECTICUT ASSOCIATION'S SUMMER MEETING.

THE CONNECTICUT HARDWARE ASSOCIATION held its summer meeting and outing at the Pequot Club, Morris Cove, near New Haven, Conn., Wednesday, July 11. The attendance was large, in comparison to summer meetings of other years. The weather was exceptionally fine and everything helped to make the occasion one of unusual pleasure. A directors' meeting was held previous to the dinner, which was served at 1.30 o'clock. Afterward a brief business meeting was held, with President George J. Bassett in the chair. Secretary James De F. Phelps read his report as the association's delegate to the annual convention of the National Retail Hardware Association at Chicago. In the course of his remarks, while speaking of the value of association work, he suggested that at the annual meeting time be set aside for an experience meeting, at which members should describe results which have been brought about to their own benefit by association membership.

Entertaining the National Association.

It was suggested that the Connecticut Association co-operate with the New England Association in entertaining the National Association, which will hold its annual meeting at Boston in March, 1907. The idea was received with much favor. Charles G. Agard of Torrington, last year's president of the association, moved that a committee of ten be appointed by the chair, the president acting as chairman, to handle the association's part in the March meeting, and the motion prevailed. The president did not announce the committee. President Bassett urged a large attendance at the meeting of the National Association, stating that Hardware merchants generally were welcomed to its meetings. A. H. Abbe of New Britain, an officer of the National Association, was unable to be present because of illness, but he sent a letter, which was appreciated. The meeting voted to send to him a message of regret at his absence, the first since the association was established.

After the meeting, which took the place of after-dinner speaking, the members went aboard a steamer for the White City at Savin Rock, across the harbor, and there desported themselves in various forms of amusement.

Members Present.

Those present were:

George J. Bassett, Halsey W. Kelley, the John E. Bassett & Co., New Haven.
 Irving C. Treat, Clapp & Treat, Hartford.
 W. H. Burchell, N. T. Bushnell & Co., New Haven.
 D. H. Hough, Eaton, Chase & Co., Norwich.
 S. L. Ewald, Lyon & Ewald, New London.
 C. H. Preston, Preston Bros., Norwich.
 R. C. Lightbourn, the Lightbourn & Pond Company, New Haven.
 George H. Baker, the George H. Baker Company, New Haven.
 Louis L. Rosenberg, Louis L. Rosenberg & Co., New Haven.
 F. W. Hallock, the F. Hallock Company, Derby.
 E. H. Butler, Guilford.
 G. H. Alvord, Winsted.
 John M. Page, George D. Buck, John M. Page & Co., Naugatuck.
 Frank T. Terry, F. P. Terry & Son, Ansonia.
 A. W. Davenport, J. S. Davenport & Son, Stamford.
 Herbert L. Mills, New Britain.
 Herbert T. Clark, Willimantic.
 D. W. Clark, Shelton.
 Charles G. Agard, Agard Hardware Company, Torrington.
 J. De F. Phelps, F. S. Bidwell & Co., Windsor Locks.
 F. A. Farrar, F. T. Blish Hardware Company, South Manchester.
 Alfred G. Gruener, W. A. Warner & Bro., New Haven.
 George L. Gelbel, Jaynes Hardware Company, Greenwich.
 F. C. Bidwell, J. C. Bidwell & Co., Hartford.
 Robert C. Witte, Hartford.
 John F. Raven, Birdsey & Raven, Meriden.
 Frank M. West, C. E. Paddock, with Frank M. West, Bridgeport.

PRICE-LISTS, CIRCULARS, &c

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

GENDRON WHEEL COMPANY, Toledo, Ohio: Catalogues representing Children's Wagons, Coasters, Velocipedes, Cycle Wagons, Autos, Hand Cars, Hook and Ladder and Patrol Wagons, Goat and Dog Sulkies, Wheelbarrows, Delivery Carts, Doll Cabs and Go-Carts, Wood Novelties, Children's Chairs, Bicycles, Children's Go-Carts and Carriages, Rolling Chairs, &c.

ASSOCIATED SILVER COMPANY, 174 East Lake street, Chicago, Ill.: Illustrated catalogue of Solid Yourex Silver Flat Ware, which is shown in several patterns.

THE SHERWIN-WILLIAMS COMPANY, Cleveland, Ohio: The July number of the *S. W. P.*, a magazine published monthly by the company, illustrates and describes their plants and stores in different cities and additions made during the past year.

MARSHALLTOWN TROWEL COMPANY, Marshalltown, Iowa: Catalogue illustrating Finishing and Browning Trowels, Aluminum Hawks, Aluminum Darbies, Canvas Tool Bags, Plasterers' Cork Floats, Brick Chisels, Carpenters' or Crooked Bars, Housemovers' Bars, Brick Hammers, Bricklayers' Scutches, Beading Tools, Aluminum Sidewalk Edgers and Groovers. The Finishing and Browning Trowels are hand made, while the Brick Hammers and Bricklayers' Scutches are hand forged.

THE DUFF MFG. COMPANY, Pittsburgh, Pa.: Special catalogue of the Duff Roller Bearing Screw Jacks and the Duff Cone Bearing Screw Jacks. These are made in various styles and sizes adapted to the safe, economical and convenient handling of railway equipment and for general purposes.

B. F. AVERY & SONS, Louisville, Ky.: Catalogue 1906-1907, devoted to walking and riding Plows, Cotton and Corn Planters, Cultivators, Stalk Cutters, Land Rollers, Harrows, Steel Trees, Neck Yokes, &c.

UTICA DROP FORGE & TOOL COMPANY, Utica, N. Y.: Catalogue entitled "Plier Palmistry," devoted to Nippers and Pliers. The point is made that these goods are especially designed to fit the hand, and several illustrations are given showing the wrong and right way to grasp and hold Pliers.

THE GOSHEN CHURN & LADDER COMPANY, Goshen, Ind.: Catalogue relating to Step, Windless Extension, Fruit and Roof Ladders; Painters' Trestles, Stage Ladders, Lawn Swings and Awnings, Folding Lawn Settees, Porch Chairs, Wheelbarrows, &c.

A. MEINECKE & SON, Milwaukee, Wis.: Catalogue of Wooden Toys, including Rocking Horses, Doll Carriages, Children's Carriages, Go-Carts, Children's Rockers, Desks and Bureaus, Furniture Novelties, &c.

FRANK L. JONES, Utica, N. Y.: Forty-first annual price-list devoted to Supplies, Utensils and Machinery for cheese factories and creameries, dairies, milk stations, milk dealers, &c.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass.: Abridged catalogue, containing illustrations and detailed descriptions of all of the company's staple numbers, including the new No. 80 Repeating Gallery Rifle, which will be ready in September; Stevens' Little Scout Rifle No. 14, and No. 325 Double Barrel Hammerless Shotgun. The two latter new models are now on the market.

THE NEW YORK CORDAGE COMPANY, 79 Wall street, New York, has recently registered a trademark for Rope, Twine and Cord, consisting of the word "Nycord." The company has been using this trademark since 1903, at which time it commenced business.

ANTON W. ACHARD, president of the Saginaw Hardware Company, Saginaw, Mich., died at his home in that city on Saturday, the 7th inst.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM **R. F. MITCHELL**, who has acquired a stock of Hardware and Implements in Aliceville, Kan. The stock includes Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Sporting and Athletic Goods, &c.

FROM **HELENA HARDWARE COMPANY**, Incorporated, Helena, Mont., which is conducting a wholesale business in Shelf and Heavy Hardware, Stoves, Sporting Goods, Mining and Milling Supplies, Pipes, Fittings, &c. M. V. Wilson and T. F. McLaughlin, formerly of Wells & Nellegar Company, Chicago, and lately of A. M. Holter Hardware Company, Helena, have purchased a two-thirds interest in the Helena Hardware Company.

FROM **GEO. F. CHAMBERLAIN**, who has just engaged in the wholesale and retail Hardware business at Sandpoint, Idaho. Mr. Chamberlain was for 15 years connected with the Schrieber & Conchar Mfg. Company, Dubuque, Iowa, in the capacity of salesman and buyer.

FROM **MINIDOKA HARDWARE COMPANY**, recently removed from Minidoka to Twin Falls, Idaho. The business is largely retail, though some wholesaling is done, and the lines carried include Shelf Hardware, Stoves, Tinware, Paints, Oils, Sporting and Athletic Goods.

FROM **BUTLER & SAUNDERS**, Trenton, Texas, who recently sustained a fire loss, but have again resumed business. Their stock includes Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, &c.

FROM **BEWLEY HARDWARE COMPANY**, Union, S. C., which has been organized with a capital of \$20,000 and will commence the wholesale and retail business in general Hardware at an early date. The former stock of the Oetzel Hardware Company has been purchased as a starting basis.

WYETH HARDWARE & MFG. COMPANY'S CATALOGUE.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo., has recently issued a general Hardware catalogue of the loose leaf type, containing 1500 pages, in addition to which are 37 pages of approximate prices applying to every item shown in the catalogue. The pages are 11 $\frac{1}{2}$ x 12 in. in size. The book is divided into departments as follows: Mechanics Tools, Farming, Garden and Lawn Tools, Builders' Hardware, miscellaneous Hardware, Paints, Brushes and Household Goods, Enameled, Nickel Plated Copper, Japanned, Galvanized, Pieced and Stamped Wares, Tinnings' Trimmings and Supplies, Cutlery, Sporting Goods, Bicycles and Fishing Tackle. The book is well printed on a good quality of paper. It is conveniently arranged, with substantial covers, which permit the addition of a large number of leaves to those which are now contained. The divisions devoted to Builders' Hardware and Cutlery are particularly exhaustive, while large assortments are shown in the other divisions. Five thousand copies of the book have been issued. The approximate prices are designed to serve as a guide to the merchant in selling such goods as he does not carry in stock, and regarding the prices of which he is not fully posted. The catalogue is a credit to the company and will no doubt prove a valuable assistant to the merchant in selling and ordering goods. The business of this company was established nearly 50 years ago. Its main store and offices are now located at 609-625 North Second street; Harness and Saddle factory, 302-314 North Second street; Collar factory, 221-223 North Second street, and warehouse at 709-715 North Third street.

LABOR PROBLEMS VS. DIVIDENDS.

THIS is the title of a 16-page book by T. S. Laughlin, president of the Thos. Laughlin Company, Portland, Maine. The author seeks to show how small leaks in labor matters destroy profits, and how strict attention to work by employees increases them. A variety of tables enforce and illustrate the principle that the waste of a small fraction of an hour involves in the aggregate a serious loss, and that anything which increases the effectiveness of workmen, even a little, contributes materially to the success of the business. The method of treating the subject is indicated in the following tables:

Loss in Hours, from 1 to 6 Minutes Each, and 10 Hours Per Day, 50 Men.

	Min.	Men.	Min.	Hours.
1 minute each hour.....	10	50	500	8½
2 minutes each hour.....	20	50	1,000	16½
3 minutes each hour.....	30	50	1,500	25
4 minutes each hour.....	40	50	2,000	33½
5 minutes each hour.....	50	50	2,500	41½
6 minutes each hour.....	60	50	3,000	50

Cost of Labor, 300 Days Per Year at \$1 Per Day, 1 to 6 Minutes Per Hour, 50 Men.

Hrs.	Per day.	Amount.	Days.	Amount.
8½	at \$1.....	\$0.83½	300	\$250
16½	at \$1.....	1.66½	300	500
25	at \$1.....	2.50	300	750
33½	at \$1.....	3.33½	300	1,000
41½	at \$1.....	4.16½	300	1,250
50	at \$1.....	5.00	300	1,500

There are a number of pages of similar tables relating to "Cost of Labor," "Hours of Labor," "Loss in Hours," &c. These are followed by several pages of examples in detail illustrating and applying the principles represented in the tables.

The heading of these pages showing the application of these principles, are as follows: Reduction of Hours to make Stock Worthless, Amount of Increase to Pay Dividends, Extent of Improvements Necessary to Pay Dividends, Lost Time Required to Stop Dividends, Reduction of Wages Necessary to Pay Dividends, Profits Required to Get Dividends, Net Profit on Each Man to Pay Dividends, Number of Hours to Pay Labor Dividends. From these headings an idea may be obtained of the character of the matter in the pamphlet, the object of which is to show to employers and employees how the best use of time will tend to make business prosperous, and how lack of industry or waste of time may injure it. An interesting and suggestive contribution is thus made to the discussion of questions relating to labor. In this connection it is interesting to note that the author is not only a prominent and successful employer and manufacturer, but has succeeded in maintaining exceedingly pleasant relations with his workmen, a strike in the factory being practically unknown. While the Company manufactures a very large line of Marine Hardware and Fittings, with a trade extending to all parts of the world, it is interesting to note that Mr. Laughlin refers to this having been accomplished largely by keeping in view three things—Modern methods in manufacture, the greatest output for the least labor, and a constant improvement in quality. The successful outcome is also alluded to as three fold—Lower prices to customers, higher salaries and wages to their employees, and larger profits for the company.

THE TURNER & STANTON COMPANY has been organized at Norwich, Conn., to manufacture Picture and Solid Braided Cords and House Hardware. The company has taken the plant formerly occupied by the Thames Arms Company, which has been equipped with the necessary machinery and manufacturing operations have commenced. It is a Connecticut corporation with a capital of \$20,000. The officers are: President, Joseph Hall; secretary and treasurer, Frank C. Turner; directors, these officers and Jesse H. Stanton.

THE partnership formerly existing between John Gregory and H. W. Titman, dealing in Hardware, Iron, Paint, House Furnishing Goods, Mine Supplies, Plaster,

Cement, &c., under the style of City Supply Company, Shenandoah, Pa., has been dissolved by mutual agreement. Mr. Gregory has purchased Mr. Titman's interest and will continue the business.

SALESMEN'S CONVENTION.

FOLLOWING their custom, the Rochester Stamping Company and Robeson Cutlery Company, Rochester, N. Y., held their annual salesmen's convention in that city during the week, June 25-30. About 50 traveling men covering all parts of the United States and Canada were in attendance. Many of the representatives were accompanied by their wives. The headquarters of the salesmen was at the Powers Hotel, but the various sessions were held in the assembly room of the large factory building, which had been handsomely decorated for the occasion.

MISCELLANEOUS NOTES.

Associated Silver Company.

Associated Silver Company, 174 East Lake street, Chicago, Ill., has added a new breakfast knife to its line of solid Yourex silver flatware. Yourex silver is a substitute for sterling silver, and is guaranteed not to tarnish in show cases. The goods being solid and not plated there is no other color under the surface to show, so that the knives may be sharpened like steel knives and may be cleaned with sapollo.

Morrison Mfg. Company's Riding Cultivator.

The Morrison Mfg. Company, Fort Madison, Iowa, has put a riding cultivator on the market this season the new feature of which is contained in the gangs. These are so arranged that it is not necessary to move all the shovels when dodging the hill with the front shovel. This is accomplished by pivoting the gang in the middle just in front of the front shovel and attaching the rear part of the gang to a position that is fixed, so that it cannot move laterally but can move forward and backward. The arrangement is such that the front shovel can be moved very much farther sideways without affecting the position of the rear shovels. This lessens the amount of movement required to dodge hills with the front shovel.

Wagner Shingle Gauge No. 60.

Illustrated herewith is the Wagner No. 60 shingle gauge, a device gotten up for convenience and saving of time in laying shingles. The tongue of the gauge slips underneath the shingle and the teeth at the lower end of the tongue catch into the shingles, preventing the device slipping out, but not interfering with placing the article in position in a moment's time or taking it out of position when through using. A curved handle is

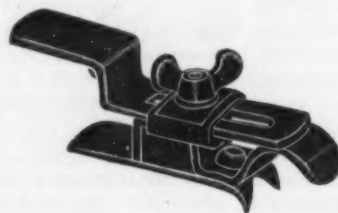


Fig. 1.—Wagner Shingle Gauge No. 60.

provided for convenience in the latter operation. Fig. 1 shows the article itself and Fig. 2 illustrates it when placed in position. The top part of the gauge is provided with a thumb nut and an adjustable gauge for adjusting the different distances which shingles are laid to the weather, giving an adjustment of from 4 to 6 in. In shingling a roof two of these gauges are used in connection with a straight edge, as shown in Fig. 3, preferably 4 in. wide. Either a regular straight edge or any

straight board from $\frac{1}{2}$ to 1 in. thick can be used. The two gauges are then placed in position, one at either end of the straight edge, and adjustment is made to whatever distance the shingles are to be laid. The shingles are

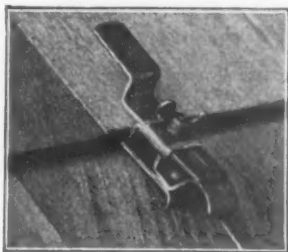


Fig. 2.—Shingle Gauge Placed in Position.

laid with the butts coming down against the straight edge, and when a row is finished the gauges are quickly withdrawn and replaced for the next row. The use of a chalk line or a nailed straight edge is thus unneces-

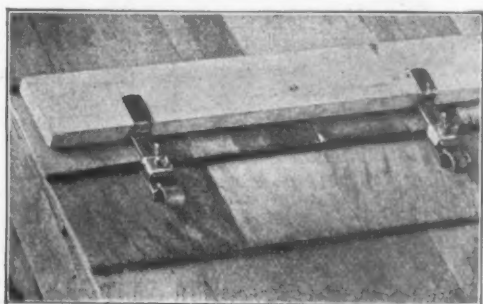


Fig. 3.—Shingle Gauge in Connection with Straight Edge.

sary. The device is put up one-half dozen in a box and is manufactured by the Wagner Mfg. Company, Cedar Falls, Iowa.

Baby Gasoline Torch.

The Zeidler Lamp & Brass Company, Lomira, Wis., for which the Boggs-Howland Company, 23 Warren street, New York, has the Eastern selling agency, has brought out the Baby gasoline torch, here shown, the novelty of which is its small size, absence of air pump, cocks or

lighted matches held under the curved tube quickly heat and vaporize the volatile material, producing a jet of fire the same as given by more expensive apparatus, but proportionately smaller. The device is recommended by the company as peculiarly suitable for telephone and telegraph linemen and other electricians, plumbers, repair shop mechanics, jewelers, dentists, doctors, chemists



Baby Gasoline Automatic Torch.

and as a laboratory torch for schools. In size it fits the hand and in use can be turned in any position, burning equally well in all. It is particularly serviceable in corners and contracted or otherwise inaccessible places. The fount should be filled about four-fifths full of 74° test clean gasoline, one charge having a capacity of about two hours' burning. The flame can be blown out with a quick, sharp breath.

Disston Plumber's and Hand Hack Saws.

Among the new goods included in the 1906 catalogue of Henry Disston & Sons, Philadelphia, Pa., are the saws illustrated herewith. The plumber's saw, Fig. 1, is especially adapted to the use of plumbers, carpenters and



Fig. 1.—Disston Plumber's Saw.

valves, and consequent slight liability to get out of order. The nicked brass fount, seamless, except that it has brazed in bottom, is $2\frac{1}{2}$ x $1\frac{1}{8}$ in., the curved tube $\frac{1}{4}$ in. in diameter, and the friction tight Bunsen tube, with eight

others when occasion requires the cutting of wood and metal. The handle is adjustable on the blade so the saw can be used at different angles. The fine tooth edge is for cutting metal and the coarser teeth for sawing

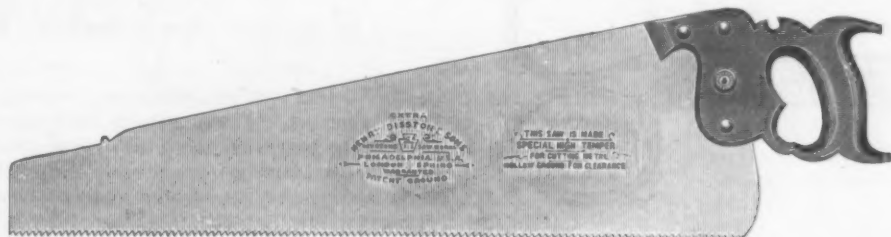


Fig. 2.—Disston Hand Hack Saw.

3-32 in. holes, is $2\frac{1}{2}$ x 7-16 in. in dimensions. Inside a loose cotton wick, attached for convenience to a small strip of brass, serves merely as a conductor of the fluid, not coming in contact with the flame. Two or three

wood. The saws are furnished in 18, 20 and 22 in. The hand hack saw, Fig. 2, is made especially high in temper for cutting metal and is hollow ground for clearance. It is furnished in eight lengths, from 16 to 30 in.

Myers Universal Pump Jack.

F. E. Myers & Bro., Ashland, Ohio, are offering the pump jack shown in the accompanying illustrations. It is back geared 6 to 1, and has a 5, 7½ and 10 in. stroke. It can be attached to any windmill pump, making an equipment adapted for use with belt power, windmill or hand, designed to be connected up without disarranging

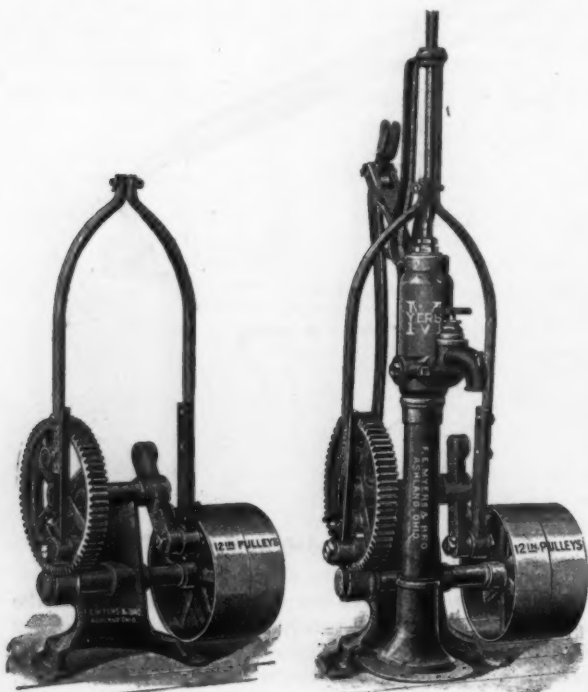


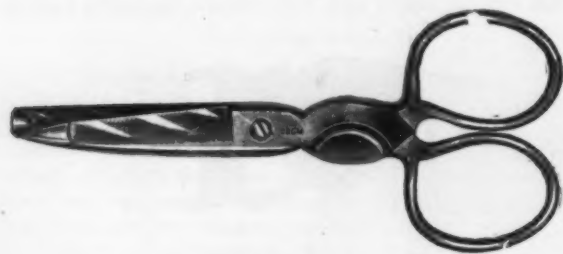
Fig. 1.—Myers Universal Pump Jack.

Fig. 2.—Myers Pump Jack Connected with Modern Cock Spout Stand.

the pump or pipes. It is mounted on a substantial bell shaped base, which surrounds the pump stand, Fig. 1, and can be bolted securely to the platform, making, it is explained, a most substantial job. The device is referred to as strong and practical and is fully guaranteed.

Combination Pocket Scissors.

Krusius Bros., 296 Broadway, New York, manufacturers of various kinds of cutlery, have just put on the market the patented combination pocket scissors here illustrated. They are 3¾ in. extreme length, polished and nickel plated and are sent out in a neat leather sheath or guard reaching to the bows. The blades have a cutting edge of 1½ in. and on one of them there is a file surface of approximately ¼ x 1¼ in., with a grooved nail file of the same length in the edge. The end of the same half is rounded and grooved for pushing back the nail



Combination Pocket Scissors.

cuticle. On the other member is a nail cleaner and near the bows is a cigar cutter, making in all six different features in a single article, that can be readily carried in the vest pocket. The scissors are made of good quality steel and have fine cutting edges.

The Long Patent Universal Double Swivel Vises.

The Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa., is offering the double swivel vises shown in the accompanying cuts. The sectional view, Fig. 1, shows that the vise has a swiveling body formed in two sections, the two semicircular projections at the bottom turned to fit and swivel in the seat provided in the base being adapted to tilt slightly in respect to each other and to lock frictionally in the seat when the vise jaws are tightened on a piece of work. The base is shown separated from the body of the vise in Fig. 2. This tilting action also allows the jaws to be clamped by tightening the main screw at any angle in the vertical plane. In Fig. 2 is shown how the vise is capable of having its jaws

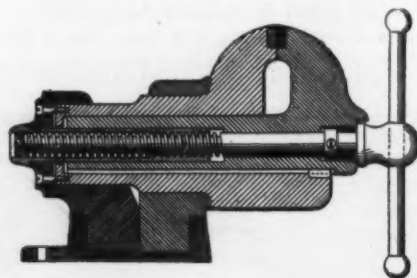


Fig. 1.—The Long Patent Universal Double Swivel Vises.

revolve in a complete circle, as well as its base, thus describing any degree of two complete circles. The body of the vise, simply resting on its base, can instantly be removed to another base located on a drill, planer or shaper and can be used as a universal jig. If a smaller vise than its face is required the jaws can be thrown at a right angle and the side of the same used, thus making two vises in one. Pieces too heavy to be lifted from the floor can be placed edgewise and securely gripped by the jaws. In operation, the jaws being tightened upon an object tightens or draws upon the screw, which draws the friction plate (attached to the female screw), which



Fig. 2.—Long Patent Double Swivel Feature.

in turn bears against the yokes, forcing them toward each other at the top, which frictionally binds them against the barrel or rear jaw. Being pivoted just above the base the bottoms are pressed outwardly against the same and locked. A double swivel, swivel jaw vise is shown in Fig. 3. The pipe vise, Fig. 4, consists of a base, two yokes, a screw with a chain attached to it, and a round mandrel, at the end of which are attached the pipe jaws. The pipe being placed in position the chain is placed around it and one of the links placed in the lugs on top of the vise. The screw is then turned, thus drawing upon the chain, which binds the pipe, at the same time drawing the yokes together at the top and spreading

them at the bottom, friction thus locking them. The vise takes from 1/4 to 7 in. pipe, inclusive. The vise holds pipe at any angle and in any position, thus facilitating thread-

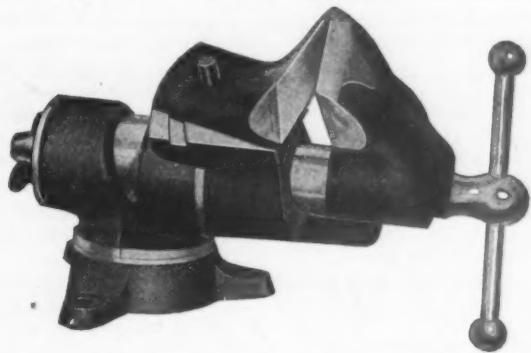


Fig. 3.—Long Patent Wood Workers' or Coach Makers' Vise.

ing and working nipples or any odd shaped pieces which require to be turned in several positions, this being done

without removing the piece from the vise. The company also makes single swivel vises, which swivel in the base. All vises are made entirely of steel, the front jaw and

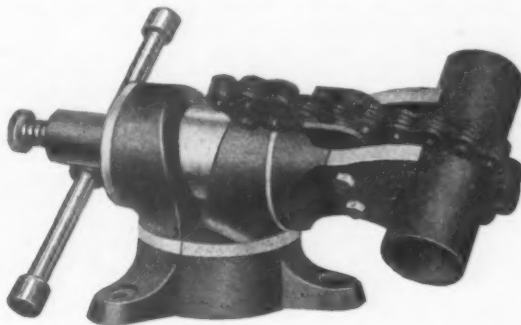


Fig. 4.—Long Patent Double Swivel Pipe Vise.

slide bar being made from a solid piece of cast tool steel, guarantee against breakage.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		Miscellaneous—		Blue, Ultramarine.....13 @16		Black, Ivory.....16 @20	
table Oils—				Brown, Vandyke.....11 @14		Lamp, Com.....4 1/2 @ 6	
Linseed, City, raw.....	39 @40	Barytes:		Green, Chrome.....12 @16		Blue, Celestial.....4 @ 6	
City, Boiled.....	40 @41	White, Foreign.....	1 ton \$17.50@19.00	Green, Paris.....13 @24		Blue, Chinese.....29 @32	
State and Western, raw.....	37 @38	Off color, No. 2.....	1 ton 13.50@15.00	Sienna, Raw.....13 @15		Blue, Prussian.....27 @30	
Raw Calcutta Seed.....	68 @	Chalk, in bulk.....	1 ton 3.00@3.25	Sienna, Burnt.....12 @15		Blue, Ultramarine.....4 1/2 @15	
Lard, Extra Prime.....	70 @71	China Clay, English.....	1 ton 11.00@17.00	Umber, Raw.....11 @14		Brown, Spanish.....1 1/2 @ 1	
Extra No. 1.....	33 @34	Cobalt, Oxide.....	100 lb 2.50@2.60	Umber, Burnt.....11 @14		Carmine, No. 40.....\$3.10@3.20	
No. 1.....	41 @43	Whiting, Common.....	100 lb .43@.48	White Lead, Zinc, &c.—			
Cotton-seed, Crude, f.o.b. mills.....	@	Gilders.....	100 lb .50@.55	Lead, English white, in Oil.....9 1/4 @ 9 1/4			
Summer Yellow, Prime.....	37 1/2 @38	Ex. Gilders.....	100 lb .55@.60	Lead, American white, in Oil:			
Summer Yellow, off grades.....	@			Lots of 500 lb or over.....@ 7 1/4			
Sperm, Crude.....	53 @	Putty, Commercial—	100 lb	Lots less than 500 lb.....@ 7 1/4			
Natural Spring.....	@	In bladders.....	\$1.70 @1.85	In Barrels.....@ 6 1/4			
Bleached Spring.....	@	In bbls. or tubs.....	1.20 @1.40	Lead, White, in oil, 25 lb tin			
Natural Winter.....	63 @65	In 1 lb to 5 lb cans.....	2.65 @2.95	pails, add to keg price.....@ 6 1/4			
Bleached Winter.....	66 @67	In 12 1/2 to 50 lb cans.....	1.50 @1.90	Lead, White, in oil, 12 1/2 lb tin			
Bleached Winter, Extra.....	68 @69			pails, add to keg price.....@ 6 1/4			
Tallow, Prime.....	51 @53	Spirits Turpentine—	1 gal.	Lead, White, in oil, 1 to 5 lb			
Whale, Crude.....	32 @33	In Oil bbls.....	59 1/2 @60 1/4	assorted tins, add to keg price.....@ 1 1/4			
Natural Winter.....	43 @44	In machine bbls.....	60 1/4 @60 3/4	Lead, American, Terms: For lots 12			
Bleached Winter.....	45 @46	Glue—	1 lb	tons and over 1/4¢ rebate; and 2% for			
Extra Bleached Winter.....	47 @48	Cabinet.....	11 @15	invoice; for lots of 500 lbs. and			
Menhaden, Brown, Strained.....	26 @29	Common Bone.....	7 @ 9	2% for cash if paid in 15 days from			
Light, Strained.....	27 @30	Extra White.....	18 @24	date of invoice, for lots of less than			
Bleached, Winter.....	@	Foot Stock, White.....	11 @14	500 lbs. net.....1 lb			
Extra Bleached, Winter.....	@	Foot Stock, Brown.....	8 @11	Lead, White, Dry, in bbls.....@ 6 1/4			
Southern.....	@	German Hide.....	12 @18	Zinc, American, dry.....6 1/2 @ 6 3/4			
Cocanut, Ceylon.....	1 lb 7 @ 7 1/4	French.....	13 @16	Zinc, French.....			
Cochin.....	1 lb 8 @ 8 1/4	Irish.....	9 @12	Antwerp, Red Seal, dry.....8 1/4			
Cod, Domestic, Prime.....	30 @33	Low Grade.....	9 @12	Antwerp, Green Seal, dry.....10 1/2			
Newfoundland.....	35 @37	Medium White.....	14 @17	Paris, Red Seal, dry.....9 1/4			
Red, Elaine.....	36 @39	Gum Shellac—	1 lb	Paris, Green Seal, dry.....10 1/4			
Red, Saponified.....	1 lb 4 1/4 @ 5	Bleached Commercial.....	43 @47	Zinc, V. M. French, in Poppy Oil:			
Olive, Italian, bbls.....	56 @60	Bone Dried.....	53 @57	Green Seal:			
Neatsfoot, Prime.....	48 @49	Button.....	40 @50	Lots of 1 ton and over.....12 1/2 @13 1/4			
Palm, Logos.....	1 lb 6 @	Diamond I.....	54 @55	Lots of less than 1 ton.....12 1/2 @13 1/4			
		Pine Orange.....	50 @52	Zinc, V. M. French, in Poppy Oil:			
		A. C. Garnet.....	56 @60	Red Seal:			
		D. C.....	58 @60	Lots of 1 ton and over.....11 1/4 @11 1/4			
		Octagon B.....	52 @52	Lots of less than 1 ton.....11 1/4 @11 1/4			
		T. N.....	46 @48	Discounts—French Zinc—Discounts			
		V. S. O.....	45 @45	to buyers of 10 bbl. lots of one or mixed			
				grades, 1 1/2; 25 bbls., 2 1/2; 50 bbls., 4 1/2.			
		Colors in Oil—	1 lb	Dry Colors—			
		Black, Lampblack.....	12 @14	Black, Carbon.....5 @10			
		Blue, Chinese.....	36 @46	Black Drop, American.....4 @ 6			
		Blue, Prussian.....	32 @36	Black Drop, English.....5 @15			

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

ISSUED EVERY THURSDAY MORNING.

Subscription, postpaid, \$5.00 a year

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ADVERTISING RATES ON APPLICATION.

New York (Main Office),	14-16 Park Place,	DAVID WILLIAMS CO., Pub.
Philadelphia,	Real Estate Trust Co. Bldg., Broad and Chestnut Sts.,	S. S. RECKEFUS, Manager.
Pittsburgh,	Park Building, 357 Fifth Avenue,	ROBERT A. WALKER, Manager.
Chicago,	Fisher Building, Dearborn and Van Buren Streets,	A. A. AINSWORTH, Manager.
Cincinnati,	Pickering Building, Fifth and Main Streets,	HENRY SMITH, Manager.
Boston,	Compton Building, 161 Devonshire Street,	WALTER C. ENGLISH, Manager.
Cleveland,	The Cuyahoga, 311 Superior Street,	EZRA S. ADAMS, Manager.

Remittances should be made by Draft, payable to the order of DAVID WILLIAMS COMPANY, on any banking house in the United States or Europe, or by Post Office, Bank or Express Money Order on New York. When those cannot be obtained, postage stamps of any country will be received.

Newsdealers or Booksellers in any part of the world may obtain The Iron Age through the American News Company, New York, U. S. A. The International News Company, New York, U. S. A., and London, England; or the San Francisco News Company, San Francisco, Cal., U. S. A.

ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies

that the price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33 1/2 %
North's.....10 %
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35 %
Taplin's Perfection.....35 %

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil..... $\frac{1}{2}$ lb. 6¢ @ 1¢
Hay-Budden, Wrought..... $\frac{1}{2}$ lb. 6¢ @ 1¢
Horseshoe Brand, Wrought..... $\frac{1}{2}$ lb. 6¢ @ 1¢
Trenton..... $\frac{1}{2}$ lb. 6¢ @ 1¢

Imported—

Peter Wright & Sons..... $\frac{1}{2}$ lb. 10¢ @ 1¢

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15¢ @ 10 %

Apple Parers—See Parers—

Aprons, Blacksmiths'—

Livingston Nail Co.....33 1/2 %

Augers and Bits—

Com. Double Spur.....75¢ @ 75¢ @ 5 %
Jennings' Patn., reg. finish.....50¢ @ 100¢ @ 60 %

Black Lip or Blued.....60¢ @ 10 %
Boring Mach. Augers.....70¢ @ 10 %
Car Bits, 12-in. twist.....50¢ @ 10 %
Ford's Auger and Car Bits.....40¢ @ 5 %
Foster Pat. Auger Bits.....25 %
C. E. Jennings & Co.:
No. 10 ext. lip, H. Jennings' list.....40¢ @ 75 %
No. 30, H. Jennings' list.....40¢ @ 75 %
Russell Jennings.....25¢ @ 100¢ @ 25 %
L'Hommedieu Car Bits.....15 %
Mayhew's Countersink Bits.....45 %
Millers Falls.....50¢ @ 100¢ @ 75 %
Ohio Tool Co.'s Bailey Auger.....40¢ @ 10 %
Car Bits.....20 %
Pugh's Black.....20 %
Pugh's Jennings' Pattern.....35 %
Snell's Auger Bits.....60 %
Snell's Bell Hangers' Bits.....60 %
Snell's Car Bits, 12-in. twist.....40¢ @ 10 %
Wright's Jennings' Bits.....35 %

Bit Stock Drills—

See Drills, Twist—

Expansive Bits—

Clark's small, \$18; large, \$25.....50¢ @ 10 %
Clark's Pattern, No. 1, $\frac{1}{2}$ doz. \$25.....65 %
No. 2, \$18.....65 %
Ford's, Clark's Pattern.....60¢ @ 5 %
C. E. Jennings & Co., Steer's Pat.....25 %
Swan's.....90 %

Gimlet Bits—

Common Dble. Cut.....\$3.00 @ \$3.50
German Pattern, Nos. 1 to 10, \$1.00; 11 to 13, \$1.75

Hollow Augers—

Bonney Pat., per doz. \$5.50 @ 6.00
Universal.....25¢ @ 10 %
Wood's Universal.....25 %

Ship Augers and Bits—

Ship Augers.....\$5.50 @ 6.00
Ford's.....35¢ @ 5 %
C. E. Jennings & Co.:
L'Hommedieu's.....12 %
Watrous.....35¢ @ 5 %
Ohio Tool Co.'s.....40 %
Snell's.....40 %

Awl Hatts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75 @ \$3.00
Unhanded, Shl'dered.....gro. 65¢ @ 70¢
Unhanded, Patent.....gro. 60¢ @ 70¢

Peg Awls—

Unhanded, Patent.....gro. \$1 @ \$1.40
Unhanded, Shl'dered.....gro. 65¢ @ 70¢

Scratch Awls—

Handled, Com.gro. \$3.50 @ \$4.00
Handled, Socket.....gro. \$1.50 @ \$2.00
Hurdwood.....40 %

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights:
First Quality.....\$1.75 @ \$5.00
Second Quality.....\$1.25 @ \$1.50
Double Bit, base weights:
First Quality.....\$7.00 @ \$7.50
Second Quality.....\$6.50 @ \$7.75

Axle Grease—

See Grease, Axle

Axles—

Concord, Loose Collar.....44¢ @ 44¢
Concord, Solid Collar.....44¢ @ 54¢
No. 1 Common, Loose.....34¢ @ 34¢

No. 1 1/2 Com., New Styles.....44¢ @ 44¢
No. 2 Solid Collar.....44¢ @ 44¢

Half Patent:
Nos. 7, 8, 11 and 12.....75¢ @ 75¢ @ 5 %
Nos. 13 to 14.....70¢ @ 100¢ @ 75¢ @ 5 %
Nos. 15 to 18.....75¢ @ 100¢ @ 75¢ @ 5 %
Nos. 19 to 22.....75¢ @ 100¢ @ 75¢ @ 5 %

Boxes, Axle—

Common and Concord, not turned.....1b. 44¢ @ 54¢
Common and Concord, turned.....1b. 54¢ @ 64¢
Half Patent.....1b. 64¢ @ 64¢

Bait—

Hendryx:
A Bait.....20 %
B Bait.....25 %
Competitor Bait.....20¢ @ 5 %

Balances—

Caldwell new list.....50 %
Fullman.....50¢ @ 100¢ @ 60 %

Spring—

Spring Balances.....50¢ @ 100¢ @ 60 %
Chatillon's:
Light Spg. Balances.....50¢ @ 10 %
Straight Balances.....40¢ @ 50 %
Circular Balances.....50¢ @ 10 %
Large Dial.....50 %

Barb Wire—See Wire, Barb.

Bars—

Steel Crowbars, 10 to 40 lb.....per lb., 34¢ @ 34¢

Towel—

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ gro. \$8.50

Beams, Scale—

Scale Beams.....40¢ @ 100¢ @ 50 %
Chatillon's No. 1.....30 %
Chatillon's No. 2.....40 %

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered $\frac{1}{2}$ doz. \$4.25;
Timed.....\$1.00
No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.10;
Timed.....\$1.20
No. 10 Wire Galvanized..... $\frac{1}{2}$ doz. \$1.75
Western W. G. Co.:
No. 1 Electric..... $\frac{1}{2}$ gro. \$7.80
No. 2 Buffalo..... $\frac{1}{2}$ gro. \$9.00
No. 3 Perfection Duck..... $\frac{1}{2}$ gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 1, Jap'd.....\$1.20; No. 1, Tin'd, \$1.50; No. 2, Jap'd, \$2.00; No. 2, Tin'd, \$2.25.
Lyon, Jap'd, per doz., No. 2, \$1.25; No. 3, \$1.50.
Taplin Mfg. Co.:
Improved Dover, per gro. No. 63, \$6.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$8.50; No. 202, Tumbler Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....\$6.00
Western, W. G. Co., Buffalo.....\$7.00
Wonder (R. M. Co.)..... $\frac{1}{2}$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List.....60¢ @ 100¢ @ 10¢ @ 5 %

Hand—

Inch. 6 7 8 9 10
Doz. \$4.75 5.70 6.65 7.60 8.85

Molders—

Inch. 9 10 11 12 14
Doz. \$8.00 9.00 10.50 12.50 14.50

Bells—

Ordinary goods.....70¢ @ 70¢ @ 5 %
High grade.....70¢ @ 100¢ @ 70¢ @ 5 %
Jersey.....75¢ @ 10 %
Texas Star.....50 %

Door—

Abbe's Gong.....45 %
Burton Gong.....50 %
Home, R. & E. Mfg. Co.'s.....55¢ @ 10 %
Trip Gong.....50¢ @ 100¢ @ 50¢ @ 5 %
Yankee Gong.....55 %

Hand—

Hand Bells, Polished, Brass.....60¢ @ 10 %
White Metal.....60 %
Nickel Plated.....50¢ @ 100¢ @ 60 %
Sticks.....60¢ @ 60¢ @ 75 %
Cone's Globe Hand Bells.....33¢ @ 35 %
Silver Chime.....33¢ @ 35 %

Miscellaneous—

Farm Bells.....lb. 24¢
Steel Alloy Church and School.....50¢ @ 100¢ @ 60 %

American Tube & Stamping Co.
Gongs.....75 %
Table Call Bells.....50¢ @ 50¢ @ 10 %

Bolting—

Extra Heavy, Short Lap.....60¢ @ 5 %
Regular Short Lap.....60¢ @ 100¢ @ 5 %
Standard.....70 %
Light Standard.....70¢ @ 5 %
Cut Leather Lacing.....50 %
Leather Lacing Sides, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....75¢ @ 75¢ @ 5 %
Common Standard.....70¢ @ 70¢ @ 10 %
Standard.....60¢ @ 50¢ @ 10 %
Extra.....60¢ @ 60¢ @ 5 %
High Grade.....50¢ @ 50¢ @ 10 %

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40 %
Detroit Standard's Lightning Tire Upsetters, No. 1, \$1.25; No. 2, \$1.25; No. 3, \$1.50; No. 4, \$1.25; No. 5, \$2.50.
Green River Tire Benders and Upsetters.....20 %

Bicycle Goods—

John S. Long's Son's 1906 List:
Chain, Parts, Spokes.....50 %
Tubes.....60 %

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—

Common Wooden.....70¢ @ 100¢ @ 75 %
Hartz St. Tackle Blocks.....50¢ @ 50¢ @ 5 %
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢ @ 10 %
Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢ @ 10 %; Wire Rope Snatch, 50%;
Lane's Patent Automatic Lock and Junior.....20 %
Stowell's Novelty, Mal. Iron.....50¢ @ 10 %
Stowell's Self Loading.....60 %
See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....40 %
Paper Embossed.....40¢ @ 10 %

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....33¢ @ 5 %

Bolts—

Carriage, Machine, &c.—Common Carriage (cut thread, $\frac{1}{2}$ x 6 and smaller).....75¢ @ 75 %
Larger and Longer.....65¢ @ 5 %
Phila. Eagle.....\$3.00 list May 21, '99

Bolt Ends, list Feb. 14, '95.....80 %

Machine, $\frac{1}{2}$ x 4 and smaller.....65¢ @ 100¢ @ 75 %
Machine, larger and longer.....65¢ @ 5 %

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:
Inch.....3 4 5 6 8
Per doz. \$0.30 .35 .45 .60 .80

Cast Iron Spring Foot, Jap'd: Inch.....6 8 10 Per doz. \$1.20 1.50 2.25

Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz. \$1.00 1.40 1.85

Cast Iron Flat Shutter, Jap'd, Brass Knobs: Inch.....6 8 10 Per doz. \$0.75 .95 1.25

Wrought Barrel Jap'd.....80¢ @ 80¢ @ 10 %
Barrel Bronzed.....50¢ @ 50¢ @ 10 %
Spring.....70¢ @ 100¢ @ 70¢ @ 10 %
Shutter.....50¢ @ 50¢ @ 100¢ @ 5 %
Square Neck.....75¢ @ 75¢ @ 10 %
Square.....66¢ @ 100¢ @ 66¢ @ 10 % @ 10 %
Ives' Patent Door.....80 %

Plow and Stove—

Plow.....65¢ @ 100¢ @ 75 %
Stove.....87¢ @ 100¢ @ 75 %

Tire—

Common Iron.....80 %
Norway Iron.....80 %

American Screw Company:
Norway Phila., list Oct. 16, '81.....80 %
Eagle Phila., list Oct. 16, '81.....82 1/2 %
Bay State, list Dec. 28, '99.....90 %
Franklin Moore Co.:
Norway Phila., list Oct. 16, '81.....80 %
Eagle Phila., list Oct. 16, '81.....82 1/2 %
Eclipse, list Dec. 28, '99.....90 %
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '81.....80 %
Eagle Phila., list Oct. 16, '81.....82 1/2 %
Mount Carmel, list Dec. 28, '99.....80 %
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80 %
Norway Phila., list Oct. 16, '81.....80 %
Upon Nut Co.:
Tire Bolts.....75 %

Borers, Tap—

Borers Tap, Ring, with Handle:
Inch.....1 1/4 1 1/2 1 3/4 2
Per doz. \$4.80 5.60 6.40 8.00

Inch.....2 1/4 2 1/2 2 3/4 3
Per doz. \$5.65 11.50

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65 @ \$1.75; No. 3, \$2.50 each.....25 %

Boxes, Mitre—

C. E. Jennings & Co.....30 %
Langdon.....15¢ @ 10 %
Perfection.....40 %
Seavey.....33 1/2 %
Stanley R. & L. Co.: Nos. 210 to 400, 30%; Nos. 50 and 60.....35 %

Braces—

Common Ball, American.....\$1.25 @ \$1.30
Barber's.....50¢ @ 100¢ @ 60¢ @ 10 %
Fray's Genuine Spofford's.....60 %
Fray's No. 70 to 120, \$1 to 123, 20¢ to 41¢
C. E. Jennings & Co.....50¢ @ 5 %
Mayhew's Hatchet.....60 %
Mayhew's Quick Action Hay Pat.....50 %
Millers Falls Drill Braces.....25¢ @ 10 %
P. S. & W. Co., Peck's Pat. 60¢ @ 60¢ @ 5 %
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45 %

Drackets—

Wrought Steel.....80¢ @ 100¢ @ 100¢ @ 5 %
Griffin's Pressed Steel.....80¢ @ 100¢ @ 10 %
Griffin's Folding Brackets.....70¢ @ 10 %
Stowell's Cast Shelf, 75%; Sink.....50 %
Western, W. G. Co., Wire.....60¢ @ 10 %

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....75¢ @ 20 %
Western, W. G. Co.....80 %
Wire Goods Co.....75¢ @ 75¢ @ 10 %

Buckets, Galvanized—

Price per dozen:
Quart.....12 14
Water, Regular.....1.40 1.70 1.90
Water, Heavy.....3.40 3.70 3.80
Fire, Rd. Bottom.....2.50 2.55 2.95
Well.....2.85 2.87 3.15

Bucks, Saw—

Hosier..... $\frac{1}{2}$ gro. \$36.00

Bull Rings—See Rings, Bull

Butts—

Wrought, list, Sept., '95. 15¢ @ 15¢ @ 5 %
Cast Brass, Tiebout's.....50 %

Cast Iron—

Fast Joint, Broad.....40¢ @ 100¢ @ 50 %
Fast Joint, Narrow.....40¢ @ 100¢ @ 50 %
Loose Joint.....70¢ @ 100¢ @ 75 %
Loose Pin.....70¢ @ 100¢ @ 75 %
Mayer's Hinges.....70¢ @ 70¢ @ 5 %
Parliament Butts.....70¢ @ 70¢ @ 5 %

Wrought Steel—

Discount:
Reversible and Broad.....75¢ @ 5 %
Light Reversible, Light Narrow.....75¢ @ 10 %
Loose Joint, Narrow, L't Inside Blind, etc.....75 %
Back Flaps, Table Chest.....70¢ @ 10 %

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, 5%; 1200, 33 1/2 %; 200, 300, 800, 300
Hendryx Bronze: Series 700, 800, 40¢ @ 10 %

Hendryx Enameled.....40¢ @ 10 %

Calipers—See Compasses.

Calks, Toe and Heel—

Blunt, 1 prong.....per lb. 44¢ @ 44¢
Sharp, 1 prong.....per lb. 44¢ @ 44¢
Burke's Blunt, 4 @ 44¢; Sharp, 4 @ 44¢

Gautier, Hunt, 4@4¢; Sharp, 4@4¢; Perkins, Blunt, 5¢; Sharp, 4.15¢

Can Openers— See Openers, Can.

Cans, Milk—

5 8 10 gal.
Illinois Pattern.....\$1.35 1.85 2.05 each.
New York Pattern.....1.50 2.20 2.45 each.
Baltimore Pattern.....1.50 2.20 2.45 each.
Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 5 10 gal.
\$18.00 60.00 120.00 gro. net.

Caps, Percussion—

Eley's E. B.....50@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 40@50¢
Musket.....per M 60@63¢

Primers—

Berdan Primers, \$2 per M.....20%
B. L. Caps (Sturtevant Shells)
\$2 per M.....20%
All other primers per M \$1.50@1.60

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢55¢
38 C. F., \$7.00.....10¢55¢
22 cal. Rim, \$1.50.....10¢55¢
32 cal. Rim, \$2.75.....10¢55¢
B. B. Caps, Con. Ball, Suedg. \$1.90
B. B. Caps, Round Ball.....\$1.49
Central Fire.....25¢
Target and Sporting Rifle.....15¢55¢
Primer Shells and Bullets.....15¢50¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢55¢

Casters—

Bed.....70@70¢10%
Plate.....60@60¢10¢55¢
Philadelphia.....75@75¢10%
Acme, Ball Bearing.....33¢4¢
Boss.....70¢10%
Boss Anti-Friction.....70¢10%
Gem (Roller Bearing).....80¢
Martin's Patent (Phoenix).....45¢
Standard Ball Bearing.....30¢
Tucker's Patent low list.....30¢
Yale (Double Wheel) low list.....50¢

Cattle Loaders—

See Loaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
5-16 1/4 5-16 3/4 7-10 1/2 9-16
\$3.70 \$3.90 4.95 4.20 4.05 3.95 3.90
3/8 3/4 1 1 1 1/2 to 1 3/4 inch.
\$3.85 3.70 3.65 3.80
German Coil.....60¢10¢10¢70%

Halter—

Halter Chains.....60¢45¢60¢10%
German Pattern Halter Chains,
list July 21, '97.....60¢10¢10%
Covert Mfg. Co.:
Halter.....35¢55¢
Covert's Saddlery Works
Halter.....70%

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6 3/4, Str'ght, with ring, \$25.00
6 1/2-6 3/4, Str'ght, with ring, \$26.00
6 1/2-6 3/4, Str'ght, with ring, \$30.00
6 1/2-6 3/4, Str'ght, with ring, \$35.00
NOTE.—Add 2c per pair for Hooks.
Twist Traces: add per pair for Nos. 2
and 3, 2c; No. 1, 3c; No. 0, 4c to price of
straight link.
Eastern Standard Traces, Wag-
on Chain, &c.....60¢10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60¢10%
Brass.....60¢10%
Safety Chain.....70¢10%
Gal. Pump Chain.....1b. 4@1/2¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40%
Covert Saddle Works:
Breast, Hold Back, Rein.....70%
Onion Community:
Am. Dog Leads and Kennel Chains,
40¢10¢55¢
Niagara Dog Leads and Kennel
Chains.....45¢60¢55¢
Wire Goods Co.:
Dog Chain.....70¢10%
Universal Dbl. Chain.....50%

Chain and Ribbon, Sash—

Onion Community:
Copper Chain, 60¢55¢; Steel Chain,
60%
Pullman:
Bronze Chain, 60%; Steel Chain,
60¢10%
Sash Chain Attachments, per set, 5¢
Aluminum Sash Ribbon, per 100
ft.....\$1.25@3.00
Sash Ribbon Attachments, per set, 8¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 40¢—¢
Carpenters' Red.....gro. 35¢—¢
Carpenters' White.....gro. 30¢—¢
See also Crayons.

Checks, Door—

Bardley's.....45%
Pullman, per gro.....\$4.90
Ruswin.....40%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools, 30%
Farmers', Carpenters', etc., Chests,
with Tools.....20%

Machinists' and Pipe Fitters'
Chests, Empty.....40%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists'
Tool Chests.....30¢10%

Chisels—

Socket Framing and Firmer

Standard List.....75¢10¢75¢10¢55%
Buck Bros.....70%
Charles Buck.....55¢55%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
L. & I. J. White.....30¢10¢55%
L. & I. J. White, Tanged.....25¢55%

Tanged—

Tanged Firmers.....33 1/3-1¢40%
Buck Bros.....30%
Charles Buck.....55¢55%
C. E. Jennings & Co. Nos. 191, 181.....25%

Cold—

Cold Chisels, good quality.....13¢15¢
Cold Chisels, fair quality.....11¢13¢
Cold Chisels, ordinary.....9¢10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat., each \$8.00.....55¢55%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40¢10%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%:
Standard, 40¢10%; Skinner Pat.,
25%; Positive Drive.....33¢4¢
Planer Chucks.....30%
Flat Plate Jaws.....40¢10%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and
84.....35%
Geared Scroll, Nos. 33, 34 and 35.....35%
Independent Iron, Nos. 18 and 38, 40%
Independent Steel, No. 61.....30%
Union Czar Drill, Nos. 000, 101,
103.....35%
Universal 11, 12, 16, 17, 13, 14, 15, 40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30,
48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and
72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable Hammers.....20¢20¢55%
Carriage Makers', P. & W.....40¢10¢50%
Besly, Parallel.....33¢4¢10%
Lineman's, Utica Drop Forge & Tool
Co.....40%
Wood Workers, Hammers.....40¢10%
Saw Clamps, see Vices, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel.....\$9 doz. \$4.05 net
Star Shank, All Steel.....\$9 doz. \$3.24 net
W. & C. Shank, All Steel.....\$9 doz.
7 1/4 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White.....30%

Cleavers, Horse and Sheep—

Chicago Flexible Shaft Company:
'98 Chicago Horse, each.....\$3.75
1902 Chicago Horse, each.....\$10.75
20th Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear
Horse, each.....\$3.75
Stewart's Patent Sheep Shear-
ing Machine, each.....\$12.75

Clips, Axle—

Regular Styles, list July 1, '05, 80%

Cloth and Netting, Wire

—See Wire, &c.

Cocks, Brass—

Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....70%
Compression Bibbs.....65¢10%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Son's list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Mane and Tail—

Covert's Saddlery Works.....60¢10%

Compasses, Dividers, &c.

Ordinary Goods.....75¢65¢75¢10%
Benis & Call Hdw. & Tool Co.:
Dividers.....65%
Callipers, Double, 65%; Inside or
Outside.....65%
Callipers, Wing.....60%
Wm. Schellhorn Co.:
Excelsior Dividers.....70%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

Territory: Galvanized
Galv. Charcoal Copper.
Steel. Iron, 1 1/2, 1 3/4, 2 1/2 oz.

Eastern:
60¢30% 61¢2 1/2% 40¢10%
Central:
70% 55¢7 1/2% 40¢7 1/2%

Western and Southern:
65¢10% 55¢2 1/2% 40¢5%

So. Western:
62 1/2¢7 1/2% 50¢5% 40¢2 1/2%

Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

Gal, each.....2 3/4 4 6 8
Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal.....\$1.80 \$2.10 \$2.40 \$3.00
Ice land, ea.....\$1.80 \$2.10 \$2.40 \$3.00

Galvanized, ea.....\$1.85 \$2.00 \$2.25 \$2.90 \$3.90
Galvanized, Lined, side handles,
Gal.....2 3/4 4 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enameled, 25%; Agate Lined, 25%

Coopers' Tools—

See Tools, Coopers'.

Coopers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 23¢2 1/2¢; lighter
than 3 lbs. to pair.....25¢26¢

Cord—Sash—

Braided, Drab.....1b. 35¢
Braided, White, Com., Nos. 8
to 12, 2 1/2¢; No. 7, 2 1/4¢; No. 6,
2 1/2¢.

Cable Laid Italian.....1b. 35¢
lb., A, 18¢; B, 16¢
Common India.....1b. 10¢10 1/4¢
Cotton Sash Cord, Twisted, 17¢19¢
Patent Russia.....1b. 6¢11¢
Cable Laid Russia.....1b. 6¢15¢
India Hemp, Braided, 1b.....6¢18¢
India Hemp, Twisted, 1b.....12¢13¢
Patent India, Twisted, 1b.....12¢13¢
Anniston Cordage Co.: 3/4 lb. solid
Braided, Nos. 8 to 12, \$0.21; No. 7,
\$0.24; No. 6, \$0.25; 3/4 doz., 50 ft.,
Oriole, \$2.00; 50 ft., Columbia, \$0.85;
50 ft., Victoria, \$1.00; 50 ft., 6-Thread,
\$1.10; 60 ft., 3-Thread, \$0.95; 50 ft.,
Manila, \$1.40; 60 ft., Jute, \$0.75.
Pearl Braided, cotton, No. 6, 3/4 lb.,
25¢; No. 7, 25¢; No. 8 to 12, 24¢;
Eddystone Braided, Nos. 8, 9 and
10, 25¢; 7, 25¢; 6, 26¢.
Harmony Cable Laid Italian, Nos. 7
to 10.....1b 23¢
Feetless:
Cable Laid, Italian, 16¢; Russian,
14¢; India.....12¢
Braided India.....18¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12:
40¢; Italian Hemp, 40¢; Linen,
55¢; White Cotton or Spot.....35¢
Massachusetts, White.....3/4 lb 30¢
Massachusetts, Drab.....3/4 lb 35¢
Phoenix, White, Nos. 8 to 12, 27¢;
No. 7, 27 1/2¢; No. 6, 28 1/2¢.
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢;
B, Drab, 40¢; B, White, 35¢;
Italian Hemp, 40¢; Linen.....57 1/2¢
See also Chain and Ribbon.

Wire, Picture—
List July 10, 1906. See Trade Re-
port.

Henry's Standard Wire Picture Cord
85¢10%

Cradles—
Grain.....40¢12 1/2%

Crayons—
White Round Crayons, Cases, 100
gro., \$6.50@7.50 at factory, but
lower prices made by jobbers.

D. M. Stewart Mfg. Co.:
Genuine, Per gro.
Round Pencil, \$2.25; Square Pen-
cil, \$1.75; Flat Crayon, \$2.50;
Metal Workers' Crayon, \$3.00;
Rolling Mill Crayon, \$3.00.

Compo. Per gro.
Round Pencil, \$1.50; Square Pen-
cil, \$1.50; Flat Crayon, \$1.50;
Metal Workers' Crayon, \$2.50;
Rolling Mill Crayon, \$2.50;
Railroad Crayon, \$4.00; Compo.
Crayon, \$4.00.

Zelicker's Lumber:
Red, Blue, Green.....3/4 gro. \$6.50
Black.....3/4 gro. \$1.00
See also Chalk.

Crooks, Shepherd's—
Fort Madison, per doz., Heavy, \$7.00;
Light.....\$6.50

Crow Bars—See Bars, Crow.

Cultivators—
Victor Garden.....50%

Cutlery, Table—
International Silver Company:
No. 12 M'd'm Knives, 1847, 9 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....9 doz. \$3.00
Wm. Rogers & Son.....9 doz. \$2.50

Cutters—Glass—
H. B. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%
Nos. 1 2 3 4 B 5
Each.....\$5 \$7 \$10 \$25 \$50 \$80

Enterprise:
Nos. 5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$1.50 \$6 25¢5¢7 1/2%
No. 202, \$1.50.....40¢7 1/2%
Dixon's.....\$ doz. 40¢50%
Nos. 1 2 3 4
\$14.00 \$17.00 \$19.00 \$30.00

Ideal.....40¢10¢50%
Little Giant.....\$ doz. 40¢50%
Nos. 305 310 312 320 322
\$35.00 \$48.00 \$44.00 \$72.00 \$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, 9 doz. \$24.00,
40¢50%

Ruswin Food, No. 1, \$24.00, No. 2,
\$27.00.....45¢10¢10%
Woodruff's.....\$ doz. 40¢50%
Nos. 100 150
\$15.00 \$18.00

Enterprise Beef Shavers.....25¢30%

Slaw and Kraut—

Henry Dinton & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 21 x 7, 26 x 8, 30
x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12.....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....\$ doz. \$3.00
Combined Slaw Cutter and Corn
Grater.....\$ doz. \$4.00

Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife.....\$ gr. \$18¢52¢
Slaw Cutters, 2 Knife.....\$ gr. \$22¢53¢

Tobacco—

All Iron, Cheap, doz. \$4.25@4.50
Enterprise.....25¢30%
National, 9 doz., No. 1, \$21; No. 2,
\$18.....40%

Diggers, Post Hole, &c.—
Dalbey Post Hole Auger, per doz. \$9.00
Iwan's Improved Post Hole Auger.....40¢5%
Vaughan Pattern Post Hole Augers,
\$ doz., \$6.25
Perfection Post Hole Diggers, 38.25
doz.
Split Handle Post Hole Diggers, 37.25
doz.

Kohler's, 3/4 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.00; Pioneer.....\$7.00
Never-Break Post Hole Diggers, 3/4
doz., \$24.00.....60%
Samson, 3/4 doz. \$34.00.....25%

Dividers—See Compasses.

Drawers, Money—
Tucker's Pat. Alarm Till No. 1, 3/4
doz., \$18; No. 2, \$15; No. 3, \$12;
No. 4, \$10.

Drawing Knives—
See Knives, Drawing.

Dressers, Emery Wheel—
Diamond Emery Wheel Dressers.....35%
Diamond Wheel Dresser Cutters.....35%

Drills and Drill Stocks—
Common Blacksmiths' Drill,
each.....\$1.50@1.75
Breat, Millers Falls.....15¢10%
Breat, F. S. & W.....40%
Goodell Automatic Drills, 40¢10¢10%
Johnson's Automatic Drills, Nos. 2
and 3.....16¢4¢
Johnson's Drill Points.....16¢4¢
Millers Falls Automatic Drills, 33¢10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's, 40%; Weston's, 40%
Ratchet, Weston's, Style H, im-
proved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P. S. & W. 50%
Whitney's Hand Drill, No. 1, \$10.00;
Adjustable, No. 10, \$12.00.....33%4%

Twist Drills—
Rit Stock.....60¢10¢10%70%
Taper and Straight Shank.....
60¢10¢60¢10¢55%

Drivers, Screw—
Screw Driver Bits, per doz. 45¢50¢
Balsey's Screw Holder and Driver, 3/4
doz., 2 1/2-in., \$4; 4-in., \$7.50; 6-in.,
\$9.....50%
Buck Bros' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, \$12.50
Gay's Double Action Ratchet.....35%
Goodell's Auto. 50¢10¢50¢10¢10¢55%
Hurwood.....40%
Mayhew's Black Hand.....40%
Mayhew's Monarch.....40¢10%
Millers Falls, Nos. 20 and 21.....25¢10%
Millers Falls, Nos. 11, 12, 41, 42, 15¢10%
New England Specialty Co.....50¢10%
Smith & Hemenway Co.....40¢5%
H. D. Smith & Co.'s Perfect H'dle, 40%
Stanley R. & L. Co.'s:
No. 61, Varn. Handles, 65%; No.
80, 75%; Victor, 55%; Defiance, 70%
Swan's:
Nos. 7565 to 7568, 50%; No. 7569,
40¢10%

Eave Trough, Galvanized—
Territory: L. C. L. Galvanized
Galv. Charcoal Copper.
Steel. Iron, 1 1/2, 1 3/4, 2 1/2 oz.

Eastern:
80% 70¢5% 40¢10%
Central:
75¢10¢7 1/2% 70% 40¢7 1/2%
Western and Southern:
70¢20¢7 1/2% 60¢15¢2 1/2% 40¢5%
So. Western:
70¢20% 65¢2 1/2% 40¢2 1/2%

Terms.—4% for cash. Factory ship-
ments generally delivered.
See also Conductor Pipe and Elbows

Elbows and Shoes—
Factory shipments, all territories:
Galv. Steel and Galv. C. I.
Standard Gauge.....60¢10%
No. 25.....30%

No. 24.....25%
No. 22.....20%
Copper.....60%

Elbows, Stovo Pipe—

Dover, one piece.....40%
Perfect Elbows (R. M. Co.).....40%

Emery, Turkish—

4 to 5 1/2 to 220: Flour.
Kegs.....1b. 5¢ 5 1/2¢ 3 1/2¢
1/2 Kegs.....1b. 5 1/2¢ 5 1/2¢ 3 1/2¢
1/4 Kegs.....1b. 5 1/2¢ 6¢ 3¢
20-lb. cans,
10 in case.....6 1/2¢ 7¢ 6¢
20-lb. cans, less
than 10.....10¢ 10¢ 8¢
Less quantity.....10¢ 10¢ 8¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's.....50&10%
Walling's.....40&10%

Cord and Weight—

Ives.....40%

Faucets—

Cork Lined.....50&10%
Metallic Key, Leather Lined.....60&10%

Red Cedar.....70&10%
Petroleum.....70&10%

B. & L. B. Co.'s.....60&10%
Star.....60%
West Lock.....50&10%

John Sommer's Peerless Tin Key.....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.....50%
John Sommer's Duplex Metal Key.....40%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined.....50%
John Sommer's Reliable Cork Lined.....50%
John Sommer's Chicago Cork Lined.....50%
John Sommer's O. K. Cork Lined.....50%
John Sommer's No Brand, Cedar.....40%
John Sommer's Perfection, Cedar.....40%

McKenna, Brass.....40%
Burglar Proof, N. P.....25%
Improved, 1/2 and 3/4 inch.....25%

Self Measuring, 1/2 doz. \$38.00.....40&10%
Enterprise, 1/2 doz. \$36.00.....40&10%
National Measuring, 1/2 doz. \$36.40.....40&10%

Felloe Plates—

—See Plates, Felloe.

Files— Domestic—

List revised Nov. 1, 1899.

Best Brands.....70&10%
Standard Brands.....75&10%
Lower Grade.....75&10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....3¢ 1-3¢@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104.....\$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Inch.....15 17 19 21
Per doz.....\$3.25 3.75 4.25 4.75
P. S. & W. Co.....30&10%
Reading Hardware Co.....60%
Stowell's Giant Grindstone Hanger.....1/2 doz. \$6.00
Stowell's Grindstone Fixtures, Extra Heavy, 50&10&10%; Light.....60&10%

Fodder Squeezers—

—See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Easy Potato.....60&10%
Victor, Hay.....60&10%
Victor, Manure.....60%
Victor, Header.....60%
Champion, Hay.....60%
Champion, Header.....60%
Champion, Manure.....60&10%
Columbia, Hay.....60&10%
Columbia, Manure.....60&10%
Columbia, Spading.....70&10%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&10%
Acme Manure, 4 line.....60&10%
Dakota Header.....60&10%
Jackson Steel Barley.....60&10%
Kansas Header.....60%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, 8' 6" Bar, per doz. 75¢@80¢
Red, 8' 6" Bar, per doz. \$1.00@1.25
Red, Dbl. Brace, per doz. \$1.40@1.50

Freezers, Ice Cream—

Qt. 1 2 3 4 6
Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.

Hemp.....\$2.75
Cotton.....3.20
Waterproof Sgl. Taped.....3.65
Waterproof Dbl. Taped.....4.40
Waterproof Tpl. Taped.....5.15

Gates, Molasses and Oil—

Stebbins' Pattern.....80&10%

Gauges—

Marking, Mortise, &c. 50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. 50&10%
Scholl's Patent.....50&10%
Door Hangers.....50&10%

Stanley R. & L. Co.'s Butt and Rabbet Gauge.....25%
Marking and Mortise.....20%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, F. S. & W. Co.....35%

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Spike, Metal, No. 1, \$4.00; 2, \$4.30

Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60

Spike, Wood Handled, No. 1, \$4.30; 2, \$4.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 60&10%
Pike Mfg. Co. 25&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush.....60&10%

International Glue Co. (Metcalf's).....40%

Grease, Axle—

Common Grade.....\$1.50@1.60
Dixon's Everlasting, 10-lb. pails, ea. \$5.00; in boxes, 1 doz., \$1.20; 2 doz., \$2.00

Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co. 33 1/2%@33 1/4%@10%

Grindstones—

Bicycle Emery Grinder.....\$6.50
Bicycle Grindstones, each.....\$2.50@3.00

Pike Mfg. Co.:
Improved Family Grindstones, per inch, 1/2 doz.....\$2.00
Pike Mortise and Tool Grinder, each.....\$6.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Halters and Ties—

Cow Ties.....60&10%
Covert Mfg. Co.:
Web.....45%
Jute Rope.....45%
Sisal Rope.....33 1/2%
Cotton Rope.....45%
Hemp Rope.....45%
Covert's Saddlery Works.....70%
Jute and Manila Rope Halters.....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties.....70%
Sisal Rope Ties.....60&10%
Onida Community:
Am. Coll. and Halters.....40&40%
Am. Cow Ties.....45&50%
Niagara Coll. and Halters.....45&50%
Niagara Cow Ties.....45&50%
E. T. Rugg & Co.:
Leather Halters.....50%
Web Halters and Webbing.....50%
Jute and Sisal Rope Halters.....60%
Ties.....60%
Cotton Horse Ties.....60%
Livery Ties, Braided.....60%

Hammers—**Handled Hammers—**

Heller's Machinists'.....40&10%
Heller's Farriers.....40&10%
Magnetic Tack, No. 1, 2, 3, \$1.25, \$1.50, \$1.75
Peck, Stow & Wilcox, Steel.....50%
Payette R. Plumb:
Plumb, A. E. Nail.....33 1/4%@33 1/4%@10&7 1/2%
Engineers' and R. S. Hand.....50&7 1/2%
Machinists' Hammers.....50&50%
Riveting and Tinner.....40&20%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢.....80&10%
3 to 5 lb., per lb., 40¢.....80&10%
Over 5 lb., per lb., 30¢.....80&10%
Wilkinson's Smiths'.....1b. 9¢@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c.....60&10%
Hoe, Rake, &c.....45&50%
Fork, Shovel, Spade, &c.....45&50%
Long Handles.....45&50%
D Handles.....50&50%

Cross-Cut Saw Handles—

Atkins.....40%
Champion.....45&45%
Dixon's.....50%

Mechanics' Tool Handles—

Auger, assorted.....\$2.50@3.00
Brad Axl.....\$1.65@1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, \$2.50@2.65; Hickory.....\$2.15@2.40
Socket Firming, Apple, \$1.75@1.95; Hickory.....\$1.45@1.60
Socket Framing, Hickory.....\$1.60@1.75
File, assorted.....\$1.30@1.50
Hammer, Hatchet, &c.....60&10%
Hand Saw, Furnished, doz. 80&85¢; Not Furnished.....65¢@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted, 75¢
Fore, doz. 45¢; Fore, Bolted, 75¢
Chapin-Stephens Co.:
Carving Tool.....40&40%
Chisel.....65&65%
File and Awl.....65&65%
Saw and Plane.....40&40%
Screw Driver.....40&40%
Milners Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle.....\$1.25@1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00.....70%
Roller Bearing, No. 11, \$15.00.....70%
Roller Bearing, Ex. Hy., No. 22, \$18.00.....70%
Hinged Hangers, \$16.00.....60&10%
Laird Bros.:
Parlor Ball Bearing, \$4.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.80; New Champion.....\$2.25
Barn Door, Standard.....\$2.25
Hinged.....\$2.25
Covered.....\$2.25
Lawrence Bros.:
Advance and Sterling.....60&10%
Cleveland and Peerless.....75%
Clipper, No. 75.....60%
Crown.....60&10%
Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25.....60&5%
Giant.....70&5%
Hummer.....70&5%
New York.....60&10%
McKinney Mfg. Co.:
No. 1, Special, \$15.....60&10%
No. 2, Standard, \$18.....60&10%
Hinged Hangers, \$18.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 117, 247, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%

Chicago Spring Butt Co.:
Friction.....25%

Oscillating.....25%

Big Twin.....25%

Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%

Elevator.....30%

Railroad.....50%

Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%

Roller Bearing.....70%

Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00.....70%

Roller Bearing, No. 11, \$15.00.....70%

Roller Bearing, Ex. Hy., No. 22, \$18.00.....70%

Hinged Hangers, \$16.00.....60&10%

Laird Bros.:
Parlor Ball Bearing, \$4.00; Standard, \$3.15; No. 105, \$2.85; New Model, \$2.80; New Champion.....\$2.25

Barn Door, Standard.....\$2.25

Hinged.....\$2.25

Covered.....\$2.25

Lawrence Bros.:
Advance and Sterling.....60&10%

Cleveland and Peerless.....75%

Clipper, No. 75.....60%

Crown.....60&10%

Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25.....60&5%

Giant.....70&5%

Hummer.....70&5%

New York.....60&10%

McKinney Mfg. Co.:
No. 1, Special, \$15.....60&10%

No. 2, Standard, \$18.....60&10%

Hinged Hangers, \$18.....50%

Meyers' Stayon Hangers.....60&5%

Richards Mfg. Co.:
Hangers, Nos. 47, 48, 117, 247, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 3

Screw Hook { 6 to 12 in. lb. 3¢
14 to 20 in. lb. 3¢
22 to 36 in. lb. 3¢
and Strap.

Screw Hook and Eye:
1/2 to 1 inch.....lb. 6¢
3/4-inch.....lb. 7¢
1-inch.....lb. 8¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers.....30¢
Hods—Coal—

Inch.....Per doz.
15 16 17 18
Galv. Open.....\$2.50 2.75 3.00 3.25
Jap. Open.....\$1.90 2.10 2.25 2.35
Galv. Funnel.....\$3.00 3.30 3.60 3.90
Jap. Funnel.....\$2.45 2.65 2.85 3.10

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each \$0.95
Steel Mortar, No. 158.....each \$1.25

Hoes—Eye—
Scovill and Oral Pattern.....
60¢10¢60¢10¢10¢

Grub, list Feb. 23, 1899.
70¢10¢75¢10¢
D. & H. Scovill.....33¢

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1904, or selling at net prices.

Crown's Weeding No. 1, \$2.00; No. 2, \$2.25
Ft. Madison Cotton Hoe.....70¢10¢10¢
Ft. Madison Crescent Cultivator Hoe.....70¢10¢
Ft. Madison Mattock Hoes:

Regular Weight.....\$ doz. 66¢
Junior Size.....\$ doz. 44¢
Ft. Madison Sprouting Hoe.....\$ doz. 50¢
Ft. Madison Dixie Tobacco Hoe.....75¢10¢75¢

Kretzinger's Cut Easy.....70¢10¢
Warren Hoe.....45¢10¢
W. & C. Ivanhoe.....75¢10¢
B. B. 6 in. Cultivator Hoe.....\$1.15
B. B. 6 in. In.....\$1.35
Acme Weeding.....\$ doz. net. \$4.35
W. & C. L. tuning Shovel Hoe.....\$ doz. \$4.35

Hoisting Apparatus—
See Machines, Hoisting.

Holders—Bit—
Angular, \$ doz. \$24.00.....45¢10¢

Door—
Bardsley's.....45¢
Empire.....50¢
Fullman.....50¢
Superior.....33¢10¢

File and Tool—
Nicholson File Holders and File Handles.....33¢10¢

Fruit Jar—
Triumph Fruit Jar Holder, \$ gross, \$10.50; \$ doz.....\$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50¢

Hooks—Cast Iron—
Bird Cage, Reading.....40¢
Clothes Line, Reading List.....40¢
Clothes Line, Stowell's.....70¢
Coat and Hat, Reading.....45¢20¢
Coat and Hat, Stowell's.....45¢
Coat and Hat, Wrightville.....45¢
Harness, Reading List.....40¢
Harness, Stowell's.....60¢
School House, Stowell's.....70¢

Wire—
Belt.....80¢10¢
Wire C. & H. Hooks.....%
75¢10¢75¢10¢10¢

Columbian Hdw Co., Gem.....70¢10¢
Parker Wire Goods Co., King.....70¢10¢
Van Wagner, Coat and Hat.....70¢
Western W. G. Co. Molding.....75¢
Wire Goods Co.:
Acme, 60¢10¢; Chief, 70¢; Crown, 75¢; Czar, 65¢; Brace, 75¢;
Czar Harness, 50¢10¢.

Wrought Iron—
Box, 6 in., per doz., \$1.00; 8 in., \$1.25; 10 in., \$2.50.
Cotton.....doz. \$1.05¢1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—
Hooks, Bench, see Stops, Bench.
Bush, Light, doz. \$1.75; Medium, \$5.35; Heavy, \$8.25
Grass, best, all sizes, per doz. \$1.60
Grass, common grades, all sizes, per doz.....\$1.30
Whiffletree.....lb. 5¢10¢

Hooks and Eyes:
Brass.....60¢50¢60¢10¢5¢
Malleable Iron.....70¢70¢10¢
Covert Mfg. Co. Gate and Scuttle Hooks.....40¢
Covert Saddlery Works' Self Locking Gate and Door Hooks.....60¢
Ft. Madison Cut-Easy Corn Hooks, \$ doz. \$3.25 net

Horse Nails—
See Nails, Horse.

Horseshoes—
See Shoes, Horse.

Hose, Rubber—
Garden Hose, 1/2-inch:
Competition.....ft. 5 @ 6¢
3-ply Guaranteed.....ft. 9 @ 9¢
4-ply Guaranteed.....ft. 10 @ 11¢
Cotton Garden, 1/2-in., coupled:
Low Grade.....ft. 8 @ 9¢
Fair Quality.....ft. 10 @ 11¢

Irons—Sad—
From 1 to 10.....lb. 3 @ 3¢1/2
B. B. Sad Irons.....lb. 3¢1/2
Mrs. Potts' cents per set:
Nos. 50 55 60 65
Jap'd Tops.....65 62 75 72
Tin'd Tops.....70 67 80 77
New England Pressing, lb. 3¢1/2

Pinking—
Pinking Irons.....doz. 60¢

Irons, Soldering—
See Copiers.

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30¢2¢; Steel, 45¢
Covert's Saddlery Works:
Daisy.....60¢10¢; Victor, 60¢
Lockport.....50¢
Lane's Steel.....30¢10¢2¢
Richards' Tiger Steel, No. 130.....50¢10¢
Smith & Hemenway Co.'s.....25¢

Kettles—
Brass, Spun, Plain.....20¢25¢
Enamelled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros' Butcher, &c.....30¢
Wilkinson Shear & Cutlery Co.....60¢

Corn—
Wilkinson Wilcut Knives and Hooks
Withington Acme, \$ doz. \$2.65;
Dent, \$2.75; Adl. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—
Standard List.....75¢45¢75¢10¢
C. E. Jennings & Co., Nos. 45, 46, 60;
Jennings & Griffin, No. 41, 42.....60¢
Ohio Tool Co.'s.....70¢
Swan's.....75¢
Watrous.....16¢
L. & J. White.....20¢5¢25¢

Hay and Straw—
Serrated Edge, per doz. \$5.75¢6.00
Iwan's Sickle Edge.....\$ doz. \$9.50
Iwan's Serrated.....\$ doz. \$10.00

Mining—
Buffalo.....\$ gro. \$13.00

Miscellaneous—
Farriers'.....doz. \$3.00¢3.25
Westenholm's.....\$ doz. \$3.00¢3.25

Knobs—
Base, 2 1/2-inch, Birch, or Maple,
Rubber Tip.....gro. \$1.25¢1.50
Carriage, Jap., all sizes.....
gro. 40¢45¢

**Door, Mineral.....doz. 65¢70¢
Door, Por. Jap'd.....doz. 70¢75¢
Door, Por. Nickel.....doz. \$2.05¢2.15
Bardsley's Wood Door, Shutters, &c. 15¢**

Lacing, Leather—
See Belting, Leather.

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50¢
Lane's Store.....25¢
Meyers' Noiseless Store Ladders.....50¢
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50¢
Climax Shelf, No. 115.....50¢
Trolley, No. 109.....50¢

Ladies, Melting—
L. & G. Mfg. Co. (low list).....25¢
P. S. & W.....50¢
Reading.....60¢

Lanterns—Tubular—
Regular Tubular, No. 0.....doz. \$4.25¢4.50
Lift Tubular, No. 0.....doz. \$4.75¢5.00
Hinge Tubular, No. 0.....doz. \$4.75¢5.00
Other Styles.....\$4.00¢4.50

Bull's Eye Police—
No. 1, 2 1/2-inch.....\$2.75¢3.00
No. 2, 3-inch.....\$3.00¢3.25

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50¢
Stowell's Badger, Cast Iron.....50¢

Latches—Thumb—
Roggin's Latches, with screw.....doz. 35¢40¢

Door—
Allith Mfg. Co., Automatic, No. 400, \$ doz. \$4.00
Cronk & Carrier Mfg. Co., No. 101, \$ doz. \$2.00
Cronk & Carrier Mfg. Co., Latch, \$ doz. \$2.00
Hasp and Staples.....50¢
Richards' Bull Dog, Heavy, No. 125.....50¢55¢
Richards' Trump, No. 127.....\$1.50
Stowell's Steel.....50¢

Leaders, Cattle—
Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45¢;
Sisal, 35¢.

Lifters, Transom—
R. & E.....33¢10¢

Lines—
Wire Clothes, Nos. 25 29 20
100 feet.....\$2.25 2.00 1.75
75 feet.....\$1.75 1.55 1.10
Anniston Waterproof Clothes, 50 ft., \$ doz. \$25.00; Gilt Edge, \$23.00; Air Line, \$23.00; Acme, \$18.00; Alabama, \$17.00; Empire, \$16.00; Advance, \$15.00; Eclipse, \$13.50; Chicago, \$11.50; Standard, \$10.50; Columbia, \$9.50; Alliston, \$13.50; Calhoun, \$12.00.

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40¢
Silver Lake Braided Chalk, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50.
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3/8, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50; No. 4 3/4, \$3.00; No. 4 1/2, \$3.50; No. 4 3/4, \$4.00; No. 5, \$4.50; No. 5 1/2, \$5.00; No. 6, \$5.50; No. 6 1/2, \$6.00; No. 7, \$6.50; No. 7 1/2, \$7.00; No. 8, \$7.50; No. 8 1/2, \$8.00; No. 9, \$8.50; No. 9 1/2, \$9.00; No. 10, \$9.50; No. 10 1/2, \$10.00; No. 11, \$10.50; No. 11 1/2, \$11.00; No. 12, \$11.50; No. 12 1/2, \$12.00; No. 13, \$12.50; No. 13 1/2, \$13.00; No. 14, \$13.50; No. 14 1/2, \$14.00; No. 15, \$14.50; No. 15 1/2, \$15.00; No. 16, \$15.50; No. 16 1/2, \$16.00; No. 17, \$16.50; No. 17 1/2, \$17.00; No. 18, \$17.50; No. 18 1/2, \$18.00; No. 19, \$18.50; No. 19 1/2, \$19.00; No. 20, \$19.50; No. 20 1/2, \$20.00; No. 21, \$20.50; No. 21 1/2, \$21.00; No. 22, \$21.50; No. 22 1/2, \$22.00; No. 23, \$22.50; No. 23 1/2, \$23.00; No. 24, \$23.50; No. 24 1/2, \$24.00; No. 25, \$24.50; No. 25 1/2, \$25.00; No. 26, \$25.50; No. 26 1/2, \$26.00; No. 27, \$26.50; No. 27 1/2, \$27.00; No. 28, \$27.50; No. 28 1/2, \$28.00; No. 29, \$28.50; No. 29 1/2, \$29.00; No. 30, \$29.50; No. 30 1/2, \$30.00; No. 31, \$30.50; No. 31 1/2, \$31.00; No. 32, \$31.50; No. 32 1/2, \$32.00; No. 33, \$32.50; No. 33 1/2, \$33.00; No. 34, \$33.50; No. 34 1/2, \$34.00; No. 35, \$34.50; No. 35 1/2, \$35.00; No. 36, \$35.50; No. 36 1/2, \$36.00; No. 37, \$36.50; No. 37 1/2, \$37.00; No. 38, \$37.50; No. 38 1/2, \$38.00; No. 39, \$38.50; No. 39 1/2, \$39.00; No. 40, \$39.50; No. 40 1/2, \$40.00; No. 41, \$40.50; No. 41 1/2, \$41.00; No. 42, \$41.50; No. 42 1/2, \$42.00; No. 43, \$42.50; No. 43 1/2, \$43.00; No. 44, \$43.50; No. 44 1/2, \$44.00; No. 45, \$44.50; No. 45 1/2, \$45.00; No. 46, \$45.50; No. 46 1/2, \$46.00; No. 47, \$46.50; No. 47 1/2, \$47.00; No. 48, \$47.50; No. 48 1/2, \$48.00; No. 49, \$48.50; No. 49 1/2, \$49.00; No. 50, \$49.50; No. 50 1/2, \$50.00; No. 51, \$50.50; No. 51 1/2, \$51.00; No. 52, \$51.50; No. 52 1/2, \$52.00; No. 53, \$52.50; No. 53 1/2, \$53.00; No. 54, \$53.50; No. 54 1/2, \$54.00; No. 55, \$54.50; No. 55 1/2, \$55.00; No. 56, \$55.50; No. 56 1/2, \$56.00; No. 57, \$56.50; No. 57 1/2, \$57.00; No. 58, \$57.50; No. 58 1/2, \$58.00; No. 59, \$58.50; No. 59 1/2, \$59.00; No. 60, \$59.50; No. 60 1/2, \$60.00; No. 61, \$60.50; No. 61 1/2, \$61.00; No. 62, \$61.50; No. 62 1/2, \$62.00; No. 63, \$62.50; No. 63 1/2, \$63.00; No. 64, \$63.50; No. 64 1/2, \$64.00; No. 65, \$64.50; No. 65 1/2, \$65.00; No. 66, \$65.50; No. 66 1/2, \$66.00; No. 67, \$66.50; No. 67 1/2, \$67.00; No. 68, \$67.50; No. 68 1/2, \$68.00; No. 69, \$68.50; No. 69 1/2, \$69.00; No. 70, \$69.50; No. 70 1/2, \$70.00; No. 71, \$70.50; No. 71 1/2, \$71.00; No. 72, \$71.50; No. 72 1/2, \$72.00; No. 73, \$72.50; No. 73 1/2, \$73.00; No. 74, \$73.50; No. 74 1/2, \$74.00; No. 75, \$74.50; No. 75 1/2, \$75.00; No. 76, \$75.50; No. 76 1/2, \$76.00; No. 77, \$76.50; No. 77 1/2, \$77.00; No. 78, \$77.50; No. 78 1/2, \$78.00; No. 79, \$78.50; No. 79 1/2, \$79.00; No. 80, \$79.50; No. 80 1/2, \$80.00; No. 81, \$80.50; No. 81 1/2, \$81.00; No. 82, \$81.50; No. 82 1/2, \$82.00; No. 83, \$82.50; No. 83 1/2, \$83.00; No. 84, \$83.50; No. 84 1/2, \$84.00; No. 85, \$84.50; No. 85 1/2, \$85.00; No. 86, \$85.50; No. 86 1/2, \$86.00; No. 87, \$86.50; No. 87 1/2, \$87.00; No. 88, \$87.50; No. 88 1/2, \$88.00; No. 89, \$88.50; No. 89 1/2, \$89.00; No. 90, \$89.50; No. 90 1/2, \$90.00; No. 91, \$90.50; No. 91 1/2, \$91.00; No. 92, \$91.50; No. 92 1/2, \$92.00; No. 93, \$92.50; No. 93 1/2, \$93.00; No. 94, \$93.50; No. 94 1/2, \$94.00; No. 95, \$94.50; No. 95 1/2, \$95.00; No. 96, \$95.50; No. 96 1/2, \$96.00; No. 97, \$96.50; No. 97 1/2, \$97.00; No. 98, \$97.50; No. 98 1/2, \$98.00; No. 99, \$98.50; No. 99 1/2, \$99.00; No. 100, \$99.50; No. 100 1/2, \$100.00; No. 101, \$100.50; No. 101 1/2, \$101.00; No. 102, \$101.50; No. 102 1/2, \$102.00; No. 103, \$102.50; No. 103 1/2, \$103.00; No. 104, \$103.50; No. 104 1/2, \$104.00; No. 105, \$104.50; No. 105 1/2, \$105.00; No. 106, \$105.50; No. 106 1/2, \$106.00; No. 107, \$106.50; No. 107 1/2, \$107.00; No. 108, \$107.50; No. 108 1/2, \$108.00; No. 109, \$108.50; No. 109 1/2, \$109.00; No. 110, \$109.50; No. 110 1/2, \$110.00; No. 111, \$110.50; No. 111 1/2, \$111.00; No. 112, \$111.50; No. 112 1/2, \$112.00; No. 113, \$112.50; No. 113 1/2, \$113.00; No. 114, \$113.50; No. 114 1/2, \$114.00; No. 115, \$114.50; No. 115 1/2, \$115.00; No. 116, \$115.50; No. 116 1/2, \$116.00; No. 117, \$116.50; No. 117 1/2, \$117.00; No. 118, \$117.50; No. 118 1/2, \$118.00; No. 119, \$118.50; No. 119 1/2, \$119.00; No. 120, \$119.50; No. 120 1/2, \$120.00; No. 121, \$120.50; No. 121 1/2, \$121.00; No. 122, \$121.50; No. 122 1/2, \$122.00; No. 123, \$122.50; No. 123 1/2, \$123.00; No. 124, \$123.50; No. 124 1/2, \$124.00; No. 125, \$124.50; No. 125 1/2, \$125.00; No. 126, \$125.50; No. 126 1/2, \$126.00; No. 127, \$126.50; No. 127 1/2, \$127.00; No. 128, \$127.50; No. 128 1/2, \$128.00; No. 129, \$128.50; No. 129 1/2, \$129.00; No. 130, \$129.50; No. 130 1/2, \$130.00; No. 131, \$130.50; No. 131 1/2, \$131.00; No. 132, \$131.50; No. 132 1/2, \$132.00; No. 133, \$132.50; No. 133 1/2, \$133.00; No. 134, \$133.50; No. 134 1/2, \$134.00; No. 135, \$134.50; No. 135 1/2, \$135.00; No. 136, \$135.50; No. 136 1/2, \$136.00; No. 137, \$136.50; No. 137 1/2, \$137.00; No. 138, \$137.50; No. 138 1/2, \$138.00; No. 139, \$138.50; No. 139 1/2, \$139.00; No. 140, \$139.50; No. 140 1/2, \$140.00; No. 141, \$140.50; No. 141 1/2, \$141.00; No. 142, \$141.50; No. 142 1/2, \$142.00; No. 143, \$142.50; No. 143 1/2, \$143.00; No. 144, \$143.50; No. 144 1/2, \$144.00; No. 145, \$144.50; No. 145 1/2, \$145.00; No. 146, \$145.50; No. 146 1/2, \$146.00; No. 147, \$146.50; No. 147 1/2, \$147.00; No. 148, \$147.50; No. 148 1/2, \$148.00; No. 149, \$148.50; No. 149 1/2, \$149.00; No. 150, \$149.50; No. 150 1/2, \$150.00; No. 151, \$150.50; No. 151 1/2, \$151.00; No. 152, \$151.50; No. 152 1/2, \$152.00; No. 153, \$152.50; No. 153 1/2, \$153.00; No. 154, \$153.50; No. 154 1/2, \$154.00; No. 155, \$154.50; No. 155 1/2, \$155.00; No. 156, \$155.50; No. 156 1/2, \$156.00; No. 157, \$156.50; No. 157 1/2, \$157.00; No. 158, \$157.50; No. 158 1/2, \$158.00; No. 159, \$158.50; No. 159 1/2, \$159.00; No. 160, \$159.50; No. 160 1/2, \$160.00; No. 161, \$160.50; No. 161 1/2, \$161.00; No. 162, \$161.50; No. 162 1/2, \$162.00; No. 163, \$162.50; No. 163 1/2, \$163.00; No. 164, \$163.50; No. 164 1/2, \$164.00; No. 165, \$164.50; No. 165 1/2, \$165.00; No. 166, \$165.50; No. 166 1/2, \$166.00; No. 167, \$166.50; No. 167 1/2, \$167.00; No. 168, \$167.50; No. 168 1/2, \$168.00; No. 169, \$168.50; No. 169 1/2, \$169.00; No. 170, \$169.50; No. 170 1/2, \$170.00; No. 171, \$170.50; No. 171 1/2, \$171.00; No. 172, \$171.50; No. 172 1/2, \$172.00; No. 173, \$172.50; No. 173 1/2, \$173.00; No. 174, \$173.50; No. 174 1/2, \$174.00; No. 175, \$174.50; No. 175 1/2, \$175.00; No. 176, \$175.50; No. 176 1/2, \$176.00; No. 177, \$176.50; No. 177 1/2, \$177.00; No. 178, \$177.50; No. 178 1/2, \$178.00; No. 179, \$178.50; No. 179 1/2, \$179.00; No. 180, \$179.50; No. 180 1/2, \$180.00; No. 181, \$180.50; No. 181 1/2, \$181.00; No. 182, \$181.50; No. 182 1/2, \$182.00; No. 183, \$182.50; No. 183 1/2, \$183.00; No. 184, \$183.50; No. 184 1/2, \$184.00; No. 185, \$184.50; No. 185 1/2, \$185.00; No. 186, \$185.50; No. 186 1/2, \$186.00; No. 187, \$186.50; No. 187 1/2, \$187.00; No. 188, \$187.50; No. 188 1/2, \$188.00; No. 189, \$188.50; No. 189 1/2, \$189.00; No. 190, \$189.50; No. 190 1/2, \$190.00; No. 191, \$190.50; No. 191 1/2, \$191.00; No. 192, \$191.50; No. 192 1/2, \$192.00; No. 193, \$192.50; No. 193 1/2, \$193.00; No. 194, \$193.50; No. 194 1/2, \$194.00; No. 195, \$194.50; No. 195 1/2, \$195.00; No. 196, \$195.50; No. 196 1/2, \$196.00; No. 197, \$196.50; No. 197 1/2, \$197.00; No. 198, \$197.50; No. 198 1/2, \$198.00; No. 199, \$198.50; No. 199 1/2, \$199.00; No. 200, \$199.50; No. 200 1/2, \$200.00; No. 201, \$200.50; No. 201 1/2, \$201.00; No. 202, \$201.50; No. 202 1/2, \$202.00; No. 203, \$202.50; No. 203 1/2, \$203.00; No. 204, \$203.50; No. 204 1/2, \$204.00; No. 205, \$204.50; No. 205 1/2, \$205.00; No. 206, \$205.50; No. 206 1/2, \$206.00; No. 207, \$206.50; No. 207 1/2, \$207.00; No. 208, \$207.50; No. 208 1/2, \$208.00; No. 209, \$208.50; No. 209 1/2, \$209.00; No. 210, \$209.50; No. 210 1/2, \$210.00; No. 211, \$210.50; No. 211 1/2, \$211.00; No. 212, \$211.50; No. 212 1/2, \$212.00; No. 213, \$212.50; No. 213 1/2, \$213.00; No. 214, \$213.50; No. 214 1/2, \$214.00; No. 215, \$214.50; No. 215 1/2, \$215.00; No. 216, \$215.50; No. 216 1/2, \$216.00; No. 217, \$216.50; No. 217 1/2, \$217.00; No. 218, \$217.50; No.

Boxwood and Maple.....30&10%

Rules

Boxwood	50¢@10¢10%
Ivory	35¢@10¢35¢10¢45%
Chapin-Stephens Co.	
Boxwood	60¢@60¢10%
Flexiford	27¢@10¢10¢24%
Ivory	35¢@35¢10¢10%
Miscellaneous	50¢@50¢10¢10%
Combination	55¢@55¢10%
Stationers	100¢@100¢10%
Keuffel & Esser Co.	
Folding, Wood	35¢@10%
Folding, Steel	33¢@10%
Lufkin's Steel	60¢@10%
Lufkin's Lumber	60¢@10%
Stanley R. & L. Co.	
Boxwood	67¢@10%
Ivory	45¢@10%
Miscellaneous	60¢@10%
Zig Zag	40¢@10%
Zig Zag, Pin Joint	42¢@10%
Unson Nut Co.	
Boxwood	60¢@60¢10%
Ivory	35¢@10¢35¢10%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Saws—

Atkins'	
Circular	50¢@10¢50%
Band	50¢@10¢50%
Cross Cuts	35¢@10%
Mulay Mill and Drag	50¢@10%
One-Man Saw	40¢@10%
Hand, Compas, &c.	40¢@10%
Chapin-Stephens Co.	
Turning Saws and Frames	30¢@30¢10%
Diamond Saw & Stamping Works	
Sterling Kitchen Saws	30¢@10¢10%
Diastion's	
Circular, Solid and Ins'ted Tooth	50¢@10%
Band, 2 to 14 in. wide	60¢@10%
Band, 1/4 to 1 1/2	60¢@10%
Crosscuts	50¢@10%
Narrow Crosscut	50¢@10%
Mulay, Mill and Drag	50¢@10%
Framed Woodsaws	35¢@10%
Woodsaw Blades	35¢@10%
Woodsaw Rods	25¢@10%
Hand Saws, Nos. 12, 99, 9, 16, 110	1 1/2, 120, 76, 7, 6
Hand Saws, Nos. 1, 107, 107 1/2, 3, 1	0, 00, Combination
Compass, Key Hole, &c.	25¢@10%
Butcher Saws and Blades	35¢@10%
C. E. Jennings & Co.'s	
Back Saws	25¢@10%
Butcher Saws	35¢@10%
Compass and Key Hole Saws	35¢@10%
Framed Wood Saws	30¢@10%
Hand Saws	20¢@10%
Wood Saw Blades	35¢@10%
Millers Falls	
Butcher Saws	15¢@10%
Star Saw Blades	15¢@10%
Peace & Richardson's Hand Saws	30¢@10%
Simonds'	
Circular Saws	50¢@10%
Crescent Ground Cross Cut Saws	35¢@10%
One-Man Cross Cuts	40¢@10%
Gang Mill, Mulay and Drag Saws	50¢@10%
Band Saws	50¢@10%
Back Saws	25¢@10%
Butcher Saws	35¢@10%
Hand Saws	25¢@10%
Hand Saws, Bay State Brand	45¢@10%
Compass, Key Hole, &c.	25¢@10%
Wood Saws	35¢@10%
Springfield Mach. Screw Co.	
Diamond Kitchen Saws	40¢@10%
Butcher Saws and Blades	35¢@10%
Wheeler, Madden & Clemens Mfg. Co.'s Cross Cut Saws	50¢@10%

Hack Saws—

Atkins' Hack Saw Blades A & A. A.	25¢@10%
Diastion's	
Concave Blades	25¢@10%
Keystone	40¢@10%
Hack Saw Frames	40¢@10%
Fitchburg File Works, The Best	35¢@10%
C. E. Jennings & Co.'s	
Hack Saw Frames, Nos. 175, 180	40¢@10%
Hack Saws, Nos. 175, 180, complete	40¢@10%
Goodell's Hack Saw Blades	40¢@10%
Griffin's Hack Saw Frames	35¢@10%
Griffin's Hack Saw Blades	35¢@10%
Springfield Mach. Screw Co.	
Diamond Hack Saw Blades	35¢@10%
Diamond Hack Saw Frames	35¢@10%
Star Hack Saws and Blades	15¢@10%
Sterling Hack Saw Blades	30¢@10%
Sterling Power Hack Saw Machines	each, No. 1, \$25.00; No. 2, \$30.00; 10%
Victor Hack Saw Blades	40¢@10%
Victor Hack Saw Frames	40¢@10%

Scroll—

Barnes, No. 7, \$15	25¢@10%
Barnes' Velociped Power Scroll Saw	40¢@10%
without boring attachment, \$18	
with boring attachment, \$20	25¢@10%
Lester, complete, \$10.00	15¢@10%
Rogers, complete, \$4.00	15¢@10%

Scalers, Fish—

Covert's Saddle Works.....60¢@10%

Scales—

Family, Turnbull's	50¢@50¢10%
Counter:	
Hatch, Platform, 1/2 oz. to 4 lbs.	10¢@10%
Two Platforms, 1/2 oz. to 8 lbs.	10¢@10%
Union Platform, Plain \$1.70	10¢@10%
Union Platform, Stpd. \$1.85	10¢@10%
Chattillon's	
Eureka	25¢@10%
Patente	40¢@10%
Crocker's Trip Scales	50¢@10%
Chicago Scale Co.	
The "Little Detective"	25¢@10%
Union or Family No. 2	50¢@10%

Portable Platform (reduced list) 50%
Wagon or Stock (reduced list) 25¢@35%
"The Standard" Portables.....50%
"The Standard" R. B. and Wagon.....50%

Scrapers—

Box, 1 Handle	doz. \$2.00@2.25
Box, 2 Handle	doz. \$2.50@2.60
Ship, Light, \$2.00; Heavy, \$4.50	
Adjustable Box Scraper (S. R. & L. Co.)	\$6.00.....45%
Chapin-Stephens Co., Box	30¢@30¢10¢10%

Screens, Window and Frames—

Maine Screen Frames.....40¢@10¢5%

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	\$2.50@2.75
2 1/2; 1 1/2, \$3.00@3.25	1 1/2, \$3.50@3.75
Bench, Wood	25¢@30%
Hand, Wood	25¢@30%
R. Bliss Mfg. Co. Hand	30¢@30¢10%
Chapin-Stephens Co. Hand	30¢@30¢10%
Ohio Tool Co. Bench and Hand	30%
Coach, Lag and Hand Rail—	
Lag, Cone Point, list Oct. 1	75¢@15%
Coach, Gimlet Point, list Oct. 1	75¢@10%
Hand Rail, list Jan. 1	75¢@10%

Jack Screws—

Standard List	75¢@10¢80%
Millers Falls	50¢@10¢10%
Millers Falls, Roller	50¢@10%
P. S. & W.	50%
Swett Iron Works	75¢@80%

Machine—

List Jan. 1, '98:

Flat or Round Head, Iron	50¢@50¢10%
Flat or Round Head, Brass	50¢@50¢10%
Set and Cap—	
Set (Iron)	80¢@80¢5%
Set (Steel, not advance over Iron)	25%
Sq. Hd. Cap	75¢@10%
Hex. Hd. Cap	75¢@10%
Rd. Hd. Cap	60¢@10%
Fillister Hd. Cap	60¢@10¢10%

Wood—

List July 23, 1905.	
Flat Head, Iron	87¢@10¢10%
Round Head, Iron	85¢@10¢10%
Flat Head, Brass	82¢@10¢10%
Round Head, Brass	80¢@10¢10%
Flat Head, Bronze	77¢@10¢10%
Round Head, Bronze	75¢@10¢10%
Drive Screws	87¢@10%

Scroll Saws—

See Saws, Scroll.

Scythes—

Grass, No. 1, Plain	\$6.25@6.75
Clipper, Bronzed Webb	\$6.50@7.00
No. 3 Clipper, Pol'd Webb	\$6.75@7.25
No. 6 Clipper and Solid Steel	\$7.00@7.50
Bush, Weed and Bramble, No. 2	\$6.50@7.00
Grain, No. 1	\$3.25@3.75
Bronzed Webb, No. 1	\$3.50@4.00
Nos. 3 and 4 Clipper, Grain	\$3.75@4.25
Solid Steel, No. 6	\$9.25@9.75

Seeders, Raisin—

Enterprise	25¢@30%
Sets—Awl and Tool—	
Fray's Adj. Tool Handles, Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7	50%
C. E. Jennings & Co.'s Model Tool Holders	30%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$15; 15¢@10%	

Garden Tool Sets

Ft. Madison Three Plows, Hoe, Rake and Shovel.....\$ doz sets \$9.00

Sets, Nail—

Octagon	gro. \$3.50@3.75
Huck Bros.	2 1/2¢@10%
Cannon's Diamond Point	gro. \$12.40
Mayhew's	gro. \$9.00
Snell's Corrugated, Cup Pt.	gro. \$7.20
Snell's Knurled, Cup Pt.	gro. \$7.20
Springfield Mach. Screw Co.	
Diamond Knurled Cup Pt.	gro. \$7.50

Regular list.....75¢@75¢10%

Saw—

Aiken's	
Genuine	50¢@10%
Imitation	50¢@10%
Atkin's	
Criterion	40%
Adjustable	40%
Bemis & Call Co.'s	
Plate	30%
Diastion's Star and Monarch	25%
Morrill's No. 1, \$15.00	50%
No. 3 and 4, Cross Cut, \$20.00	50%
No. 5 Mill, \$39.00	50%
No. 10, 11, \$51.00	50%
No. 1 Old Style, \$10.00	50%
Special, \$16.25	50%
Giant Royal Cross Cut	doz. \$8.00
Royal, Hand	doz. \$4.50
Taintor Positive	doz. \$6.75

Shaving—

Fox Shaving Sets, No. 30.....\$ doz. net, \$24.00

Smith & Hemenway Co.'s

Sharpeners, Knife—	
Chicago Wheel & Mfg. Co.	70%
Pike Mfg. Co.	
Fast Cut Pocket Knife Hones	doz. \$1.50
Mournted Kitchen Sand Stone	doz. \$1.50
Natural Grit Carving Knife Hones	doz. \$3.00
Quick Cut Emery Carving Knife Hones	doz. \$1.50
Quick Edge Pocket Knife Hones	doz. \$2.50

Skate—

Smith & Hemenway Co.....20%

Shaves, Spoke—

Iron	doz. \$1.10@1.25
Wood	doz. \$1.75@2.25
Bailey's (Stanley R. & L. Co.)	45%
Razor Edge (Stanley R. & L. Co.)	35%
Chapin-Stephens Co.	30¢@30¢10¢10%
Goodell's	doz. \$0.00.....15¢@10%
Wood's F1 and F2	50%

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.—

Best quality Jap.	70¢@70¢10%
Best quality, Nickel	60¢@60¢10%
Fair quality, Jap.	80¢@80¢5%
Fair quality, Nickel	75¢@75¢10%
Tailors' Shears	40¢@40¢10%
Acme Cast Shears	40¢@40¢5%
Heinisch's Tailor's Shears	10%
Wilkinson's Sheep 1900 list	30¢@10¢5%
Grass, 50¢@10%	Horse or Mule, 50¢@10%

Tinner's Snips—

Steel Blades	20¢@5¢@20¢10%
Steel Laid Blades	40¢@10¢10%
Forged Handles, Steel Blades, Berlin	50¢@50¢5%
Heinisch's Snips	40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to 10 in.	50%
Niagara	50%
P. S. & W. Forged Handles	20%

Pruning Shears—

Cronk's Hand Shears	33¢@10%
Cronk's Wood Hand Shears	33¢@10%
Diastion's Combined Pruning Hook and Saw	doz. \$18.00.....25%
Diastion's Pruning Hook	doz. \$12.00.....25%
John T. Henry Mfg. Co.	
Pruning Shears, all grades	50¢@10%
P. S. & W. Co.	33¢@10%
Wilkinson's Hedge, Wilcut Brand	60¢@10%

Wilkinson's Lawn and Border, Wilcut Brand.....60¢@10%

Sheaves—Sliding Door—

Stowell's Anti-Friction	50%
Reading	40%
R. & E. list	33¢@10%
Wrightsville Hatfield Pattern	80%

Sliding Shutter—

Reading list.....40%

K. & E. list.....33¢@10%

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, Club, Rival, 10 and 12 gauge	65¢@5%
Paper Shells, Empty:	
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge	25¢@5%
Blue Rival, New Climax, Challenge, Monarch, Deference, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge	20%
Climax, Union, League, New Rival, 10 and 12 gauge	25%
Climax, Union, League, New Rival, 11, 16 and 20 gauge	20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge	35%
Robin Hood, Low Brass	20¢@5%
Robin Hood, High Brass	30¢@5%

Shells, Loaded—

Loaded with Black Powder	40%
Loaded with Smokeless Powder, medium grade	40¢@5%
Loaded with Smokeless Powder, high grade	40¢@10¢10%
Robin Hood, Low Brass	50%
Comets, High Brass	50¢@10¢5%

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:	
Iron	per keg \$5.00
Steel	per keg \$3.75
Burden's, all sizes	per keg \$3.90

Shot—

Drop, up to B, 25-lb. bag	\$1.85
Drop, B and larger	per 25-lb. bag, \$2.10
Buck, 25-lb. bag	\$2.10
Chilled, 25-lb. bag	\$2.10
Dust, 25-lb. bag	\$2.30

Shovels and Spades—

Association List, Nov. 15, 1902	40%
Snow Shovels—	
Long Handle	\$2.75@3.90
Wood and Mail, D. Handle	\$3.25@3.50

Sieves and Sifters—

Hunter's Imitation	gro. \$9.50@10.00
Hunter's Genuine	per gro. \$12.00@12.50
Buffalo Metallic Blued, B. M. Co.	gr. 14¢@16 16¢@18 18¢@20
Shaker (Barler's Pat.) Flour Sifters	doz. \$2.00

Sieves, Seamless Metallic

Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 inch	
Mesh 18, Nested	doz. \$0.90@0.95
Mesh 20, Nested	doz. \$1.00@1.05
Mesh 24, Nested	doz. \$1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 12 to 22 x 36 in.	60¢@5%
20 x 40 to 24 x 50 in.	55%
24 x 60 to 24 x 120 in.	55%
Barnes' low list:	
Up to and including 20 x 36 in.	60%
20 x 40 to 24 x 50 in.	55%
NOTE: There is not entire uniformity in data used by jobbers.	

Skins, Wagon—

Cast Iron	80¢@80¢10%
Steel	40¢@40¢10%

Slates, School—

Factory Shipments.

"D" Slates.....50¢@50¢10%

Eureka, Unexcelled Noiseless.....60¢@5¢10%

Victor A, Noiseless.....60¢@5¢10%

Saw Cutters—See Cutters.

Snaps, Harness—

German</

Hindostan No. 1, R. g. lar. 8 1/2
Hindostan No. 1, Small. 10 1/2
Axe Stones (all kinds) 10 1/2
Turkey Oil Stones, Extra, 5 to
8 in. 10 1/2
Queer Creek Stones, 4 to 8 in. 20 1/2
Queer Creek Slips 40 1/2
Sand Stone 40 1/2

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., \$6.00
gro., 12 in., \$10.80
Norton Emery Scythe Stones:
Less than gross lots. \$9.00
One gross or more. \$7.20
Lots of 10 gross or more. \$4.00

Pike Mfg. Co., 1901 list:
Black Diamond S. 8. 1/2 gro. \$12.00
Lamotte S. 8. 1/2 gro. \$11.00
White Mountain S. 8. 1/2 gro. \$9.00
Green Mountain S. 8. 1/2 gro. \$8.00
Extra Indian Pond S. 8. 1/2 gro. \$7.50
No. 1 Indian Pond S. 8. 1/2 gro. \$7.00
No. 2 Indian Pond S. 8. 1/2 gro. \$4.50
Leader Red End S. 8. 1/2 gro. \$4.50
Quick Cut Emery. 1/2 gro. \$10.00
Pure Corundum. 1/2 gro. \$18.00
Crescent. 1/2 gro. \$7.00
Emery Scythe Rifles, 2 Coats. \$8
Emery Scythe Rifles, 3 Coats. \$10
Emery Scythe Rifles, 4 Coats. \$12
Balance of 1904 list 33 1/2%

Stoppers, Bottle—

Victor Bottle Stoppers. \$9.00

Stops—Bench—

Millers Falls. 15 1/2
Morrill's, No. 1, \$10.00
Morrill's, No. 2, \$12.50

Door—

Chapin-Stephens Co. 40 1/2

Plane—

Chapin-Stephens Co. 30 1/2

Straps—Box—

Cary's Universal, case lots. 25 1/2

Hame—

Covert's Saddlery Works. 60 1/2

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60 1/2

Socket. 10 1/2

Bullard, 1/2 doz. \$4.00

Excelsior Stretcher and Tack Hammer Combined, 1/2 doz. \$6.00

Strops, Razor—

Star Diagonal Strop. 25 1/2

Stuffers, Sausage—

Enterprise Mfg. Co. 25 1/2

National Specialty Co., list Jan. 1902 30 1/2

Sweepers, Carpet—

National Sweeper Co., 1/2 doz. \$12.00

Louis XV, Roller Bearing, Gold Plated. \$120.00

Hepplewhite, Roller Bearing, Silver Plated. \$72.00

Sheraton, Roller Bearing, N. kel. \$60.00

Ye Mission, Roller Bearing, Oxidized Coppered. \$36.00

Transparent, Roller Bearing, Plate Glass top. \$36.00

National Queen, Roller Bearing, \$27.00

Loyal, Roller Bearing, Veneers, \$25.00

Triple Medal, Roller Bearing, \$24.00

Nickel. \$24.00

Marion, Roller Bearing, N. kel. \$24.00

Marion Queen, Roller Bearing, \$24.00

Nickel. \$24.00

Monarch, Roller Bearing, N. kel. \$22.00

Monarch, Roller Bearing, Jap. \$20.00

Perpetual, Regular B. r's, N. kel. \$18.00

Perpetual, Regular B. r's, Jap. \$18.00

Monarch Extra (17 in. case), Roller Bearing, Nickel. \$36.00

Monarch Extra (17 in. case), Roller Bearing, Japanned. \$36.00

Auditorium (28 in. case), Roller Bearing, Nickel. \$54.00

Mammoth (30 in. case), Roller Bearing, Nickel. \$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$2.50 per dozen on twenty-five-dozen lots; Streator Metal Stamping Co.

Model E, Sanitaire. 1/2 doz. \$25.00

Model A, Sterling. 1/2 doz. \$28.00

Model B, Sterling, Nickel. 1/2 doz. \$23.00

Model B, Sterling, Japanned. 1/2 doz. \$21.00

Model C, Sterling. 1/2 doz. \$21.50

Model D, Sterling. 1/2 doz. \$19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks. 90 1/2

American Cut Tacks. 90 1/2

Suedes Cut Tacks. 90 1/2

Suedes Upholsterers'. 90 1/2

Gimp Tacks. 90 1/2

Lace Tacks. 90 1/2

Trimmers' Tacks. 90 1/2

Looking Glass Tacks. 63 1/2

Bill Posters' and Railroad Tacks. 90 1/2

Hungarian Nails. 85 1/2

Finishing Nails. 70 1/2

Trunk and Clout Nails. 80 1/2

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10 1/2% is given on light weights.

Miscellaneous—

Double Pointed Tacks. 90 1/2

See also Nails, Wire.

Tanks, Oil—

Emerald, R. M. Co. 30-gal. \$3.40

Emerald, R. M. Co. 60-gal. \$4.25

Queen City, R. M. Co. 30-gal. \$3.65

Queen City, R. M. Co. 60-gal. \$4.50

Tapes, Measuring—

Patent Leather. 25 1/2

Steel. 33 1/2

Chesterman's. 25 1/2

Eddy Asses' Skin. 40 1/2

Eddy Patent Leather. 25 1/2
Eddy Steel. 40 1/2
Keuffel & Esser Co. 40 1/2
Favorite, Ass Skin. 40 1/2
Favorite, Duck and Leather. 25 1/2
Metallic and Steel, lower list, 35 1/2
35 1/2; Pocket, 35 1/2
Lufkin's:
Asses' Skin. 40 1/2
Metallic. 40 1/2
Patent Bend, Leather. 25 1/2
Pocket. 40 1/2
Steel. 35 1/2

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 5/8-inch and larger. per 100 lbs. \$2.75 to \$3.00

Thermometers—

Tin Case. 80 1/2

Ties, Bale—Steel Wire—

Single Loop. 80 1/2

Monitor, Cross Head, &c. 70 1/2

Brick Ties—

Niagara Brick Ties. 34 1/2

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works. 60 1/2

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White. 20 1/2

Hay—

Myers' Hay Tools. 50 1/2

Stowell's Hay Carriers, 50 1/2

Forks, 50 1/2

Miniature—

Smith & Hemenway Co.'s. 25 1/2

Saw—

Atkins' Cross Cut Saw Tools. 40 1/2

Simonds' Improved. 33 1/2

Simonds' Crescent. 25 1/2

Ship—

L. & I. J. White. 25 1/2

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.50 to \$1.25; gro. \$11.50 to \$12.00

Harper, Champion or Paragon, doz. \$1.25 to \$1.40; gro. \$13.00 to \$13.50

Game—

Imitation Oneida. 75 1/2

Newhouse. 10 1/2

Hawley & Norton. 65 1/2

Victor. 70 1/2

Oneida Community Jump. 50 1/2

Mouse and Rat—

Mouse, Wood, Choker, doz. holes. 8 1/2

Mouse, Round or Square Wire, doz. 85 1/2

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, each \$1.21; 1/2 doz. \$13.25

No. 2, Rat, 1/2 doz. \$4.50; case of 50 \$7.75 doz.

No. 3 1/2, Rat, 1/2 doz. \$5.25; case of 72 \$9.00 doz.

No. 4, Mouse, 1/2 doz. \$3.85; case of 150 \$5.00 doz.

No. 5, Mouse, 1/2 doz. \$3.00; case of 150 \$4.25 doz.

Trimmers, Spoke—

Wood's E. I. 50 1/2

Trowels—

Diston Brick and Pointing. 30 1/2

Diston Plastering. 25 1/2

Diston "Standard Brand" and Garden Trowels. 35 1/2

Kohler's Steel Garden Trowels, 1/2 gro., 5 in., \$4.00; 6 in., \$6.00.

Never-Break Steel Garden Trowels. 1/2 gro. \$6.00

Rose Brick and Plastering. 25 1/2

Woodrough & McFarlin, Plastering. 25 1/2

Trucks, Warehouse, &c.—

B. & L. Block Co.:

New York Pattern. 50 1/2

Western Pattern. 50 1/2

Handy Trucks. 1/2 doz. \$16.00

Grocery. 1/2 doz. \$15.00

Daisy Store Trucks, Improved Pattern. 1/2 doz. \$18.50

McKinney Trucks. each \$10.00

Model Store Trucks. 1/2 doz. \$18.50

Tubs, Wash—No. 1 2 3

Galvanized, per doz. \$4.25 4.75 5.25

Galvanized Wash Tubs (R. M. Co.):

No. 1 2 3 10 20 30

Per doz., net. \$5.70 6.30 7.20 6.80 7.20 8.10

Twine, Miscellaneous—

Flax Twine: B. C. B.

No. 9, 1/4 and 1/2 lb. Balls. 22 1/2

No. 12, 1/4 and 1/2 lb. Balls. 18 1/2

No. 15, 1/4 and 1/2 lb. Balls. 16 1/2

No. 21, 1/4 and 1/2 lb. Balls. 16 1/2

No. 30, 1/4 and 1/2 lb. Balls. 15 1/2

Chalk Line, Cotton 1/2 lb. 25 1/2

Cotton Mops, 6, 9, 12 and 15 lb. 10 1/2

Cotton Wrapping, 5 Balls to lb. according to quality. 14 1/2

American 3-Ply Hemp, 1/4 and 1/2 lb. Balls. 13 1/2

American 3-Ply Hemp, 1-lb. Balls. 13 1/2

India 2-Ply Hemp, 1/4 and 1/2 lb. Balls (Spring Twine). 9 1/2

India 3-Ply Hemp, 1-lb. Balls. 9 1/2

India 3-Ply Hemp, 1 1/2 lb. Balls. 7 1/2

2, 3, 4 and 5-Ply Jute. 1/2 lb. 14 1/2

Balls. 9 1/2

Mason Line, Linen, 1/4 lb. Bile. 6 1/2

No. 26 1/2 Mattress, 1/4 and 1/2 lb. Balls. 3 1/2

Wool, 3 to 6 ply. B 7 1/2; A 7 1/2

Vises—

Solid Box. 40 1/2

Parallel—

Atthol Machine Co.:
Simpson's Adjustable. 40 1/2
Standard. 40 1/2
Amateur. 25 1/2
Columbian Hdw. Co. 40 1/2
Emmert Universal:
Pattern Makers' No. 1, \$18.00; No. 2, \$12.50.

Machinist and Tool Makers' No. 4A, \$12.50; No. 5A, \$7.00; No. 6A, \$10.00; No. 10A, \$22.50.
Presto Quick Acting. 25 1/2
Tiger Machinists. 40 1/2
Fisher & Norris Double Screw. 15 1/2

Holland's:
Machinists'. 40 1/2

Keystone. 65 1/2

Lewis Tool Co. 30 1/2

Adjustable Jaw. 30 1/2

Monarch, 50%; Solid Jaw. 50 1/2

Massey Vise Co.:

Clincher. 40 1/2

Perfect, 20%; Lightning Grip. 20 1/2

Merrill's. 20 1/2

Millers Falls. 60 1/2

Parker's:
Victor, 20 1/2; Regulars. 30 1/2

Vulcan's. 40 1/2

Combination Pipe. 55 1/2

Prentiss. 20 1/2

Snediker's X. L. 33 1/2

Stephens. 33 1/2

Williamson Mfg Co. Double Swivel. 40 1/2

Saw Filers—

Diston's D 3 Clamp and Guide, 1/2 doz. \$3.00. 25 1/2

Perfection Saw Clamps, 1/2 doz. \$4.50. 25 1/2

Reading. 60 1/2

Wentworth's Rubber Jaw, No. 1, 2 and 3. 45 1/2

Wood Workers—

Massey Vise Co.:

Lightning Grip, 15%; Perfect. 15 1/2

Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise. 60 1/2

Holland's Combination Pipe. 60 1/2

Massey's Quick Action Pipe. 40 1/2

Parker's Combination Pipe:

87 Series, 60%; 127 Series, 60 1/2; No. 870, 40 1/2.

Williamson Mfg Co. Double Swivel Combination Pipe. 40 1/2

Wads—Price per M.